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**THE STATUS OF ATLANTIC SALMON STOCKS IN GULF REGION,  
WESTERN NEWFOUNDLAND AND SOUTHERN LABRADOR, 1991**

by

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## ABSTRACT

Commercial and recreational Atlantic salmon fisheries harvests and adult salmon returns to index rivers in Western Newfoundland and Southern Labrador indicate low stock abundance in 1991. Harvests and index river counts were below 1990 and historical levels. Commercial harvests were influenced by quota reductions and by the presence of ice in many inshore areas, which caused a delay in the commencement of the fishery. Low recreational catches, however, indicate that reduced commercial landings did not result in increased numbers of salmon entering rivers in 1991. Low returns of adult salmon, after fisheries harvests, to index rivers in SFA 14(a) also indicate lower numbers of salmon available for spawning in 1991 compared to previous years.

The number of salmon smolt counted at Western Arm Brook counting fence in 1991 was above that of the the previous two years, suggesting a potential for increased adult returns in 1992. Based on a relationship between the number of smolts at Western Arm Brook and the total commercial and recreational small salmon harvests the following year, 1992 landings in Statistical Areas M and N are predicted to be similar to the 1984-1989 mean. This would be a significant improvement from 1991.

## RÉSUMÉ

D'après les prises commerciales et récréatives de saumons de l'Atlantique et d'après la montaison de saumons adultes dans les rivières indices de l'ouest de Terre-Neuve et du sud du Labrador, on remarque que les stocks n'étaient pas nombreux en 1991. Les prises et les résultats des dénombrements effectués dans les rivières indices étaient inférieurs à ceux de 1990 ainsi qu'aux données historiques. Les prises commerciales ont subi l'influence de la réduction des contingents et de la présence de la glace, dans de nombreux secteurs côtiers, ce qui a retardé le début de la pêche. Toutefois, le faible taux de capture de la pêche récréative démontre que la baisse des débarquements commerciaux n'a pas fait augmenter le nombre de saumons qui sont entrés dans les rivières en 1991. Une fois la pêche terminée, le peu de saumons adultes qui sont revenus dans les rivières indices de la ZPS 14(a) indique également qu'il avait moins de saumons disponibles pour le frai en 1991 qu'au cours des années antérieures.

À la barrière de dénombrement du ruisseau Western Arm, on a compté une plus grande quantité des smolts du saumon en 1991 que durant les deux années antérieures, ce qui laisse supposer une montaison d'adultes accrue en 1992. Vu le rapport entre le nombre de smolts aperçus au ruisseau Western Arm et les prises commerciales et récréatives de petits saumons l'année suivante, on prévoit que les débarquements de 1992 dans les secteurs statistiques M et N se situeront près de la moyenne de 1984 à 1989. Ceci représenterait une importante amélioration par rapport à 1991.

## INTRODUCTION

Western Newfoundland and Southern Labrador are divided into seven Statistical Areas (J2, K, L, M, N, O(50), A(01)) that comprise four Salmon Fishing Areas (12, 13, 14(A) and 14(B)) (Figure 1). Salmon Fishing Area (SFA) 14 was divided into sub-areas 14(A) and 14(B) in 1991 for the purpose of quota allocation to two geographically distinct commercial fisheries on the Northern Peninsula of Insular Newfoundland and in Southern Labrador.

The status of 1991 Atlantic salmon stocks in Western Newfoundland and Southern Labrador is assessed by: 1) comparing commercial and recreational harvests and fishing effort with historical harvests and effort; 2) comparing commercial and recreational harvests with long-term harvest trends in relation to management restrictions; 3) comparing counts of adult salmon, which have escaped commercial and recreational fisheries, at two index facilities with returns in previous years; and 4) examining the effect of salmon run-timing on fisheries harvests and counting facility returns.

### Commercial Fishery

Commercial fisheries during 1991 were regulated by season, quota, license, and gear restrictions.

The SFA 12 commercial fishery remained closed in 1991. The opening date for SFA 13 and SFA 14 was 5 June, unchanged since 1984.

Quotas in 1991 were changed slightly from those introduced in 1990. The SFA 13 quota was reduced from 35 t to 25 t and the 50 t total quota for SFA 14 was reallocated to SFA's 14(A) and 14(B) (Table 1). This reallocation reflects the difference in timing of the fishery in these two sub-areas. An earlier fishery on the Northern Peninsula than in Southern Labrador had resulted in a disproportionately larger share of the 1990 quota being taken by SFA 14(A) communities.

Licenses were issued to a total of 370 commercial salmon fishermen in 1991 (D. Melanson, DFO, Licensing, Moncton), a reduction of four from 1990 (Jones and Mullins 1992) and 115 from 1984 (Claytor et. al. 1991). The number of licenses actually fished, however, was probably less than the number issued. In 1990, for example, only 356 of out 374 fishermen licensed were actually issued commercial salmon tags (Mullins and Jones 1990). The number of licenses in each Salmon Fishing Area are shown below:

SFA	<u>Number Licenses</u>	
	1991	1990
12	0	0
13	111	112
14 (A)	201	203
14 (B)	58	59
Total	370*	374

\* 1991 licenses issued as of 16 December.

Gear restrictions for 1991 were unchanged from 1990 (Mullins and Jones 1991).

### Recreational Fishery

Recreational fishing seasons for the 53 licensed Atlantic salmon rivers (Figure 2, Table 2) in Western Newfoundland and Southern Labrador were essentially unchanged from those in 1990 and those since 1985 (Mullins and Jones 1991). Opening and closing dates were changed only to accommodate a Saturday opening and Sunday closing.

Subject to in-season closures due to low water levels, river specific season variations and quota restrictions (Table 2), 1991 seasons were as follows:

Recreational Fishing Area	Season
Fox Point to Cape Ray	8 June to 2 September
Cape Ray to Salmon Point, Bonne Bay	1 June to 2 September
Salmon Point to Cape Bauld	15 June to 2 September
Southern Labrador	8 June to 8 September

The recreational season bag limit of **15 fish**, introduced in 1986, was reduced to **10 fish** in 1991. Possession limits and daily bag limits were the same as introduced in 1986.

The requirement (except in Southern Labrador) to release all salmon greater than 63 centimeters has been in effect since 1985.

## METHODS

Salmon harvest statistics from previous reports were updated, therefore, summary tables may differ slightly from those in Mullins and Jones (1991). This difference is most relevant to 1989-1990 commercial harvests because of a delay in receiving purchase slips from some buyers.

Commercial harvests, as in previous years, were compiled from fish plant saleslips and from Supplementary 'B' slip records of local sales. Supplementary 'B' slips are compiled by Inspection and Conservation and Protection Branch, however, in 1991, as in 1990 (Mullins and Jones 1991), because of weekly quota monitoring, local sales were first compiled from weekly reports submitted by commercial fishermen. Weekly local sales were then totalled monthly and entered on Supplementary 'B' slips. Previous to 1990, local sales had simply been reported monthly, by community, directly onto Supplementary 'B' slips (Claytor et. al. 1991; Ash and O'Connell 1986)

Southern Labrador commercial landings from the communities of Carrolls Cove, Camp Islands and Cape Charles in 1991, were not deducted from the Southern Labrador quota. These landings were made by licensed salmon fishermen from Northern Labrador who traditionally fish in SFA 14(B). Therefore, their catches were deducted from the Northern Labrador quota. Landings in all Southern Labrador communities, however, were compiled as part of the SFA 14(B) catch statistics, as in previous years.

Recreational landings were compiled from weekly salmon angling reports completed by river guardians, as in previous years (Mullins and Claytor 1989).

Two comparison methods were used to relate 1991 commercial and recreational harvests with historical landings:

1. 1991 harvests were compared with landings in 1990 and with previous 5, 10 and 15 (recreational only) year means for each Salmon Fishing Area and Statistical Area.

2. 1991 harvests were also compared with the average landings for years in which Atlantic salmon fisheries management plans were similar (Table 1). Years with similar fisheries management were chosen as 1974-1977, 1978-1983 and 1984-1989. Management plans introduced in 1978-1983 were similar because they targetted conservation of large salmon ( $\geq 63$  cm) stocks by reducing commercial and recreational seasons. Management plans in 1984-1989 were also similar because of similar seasons and because they included closure of the SFA 12 commercial fishery to reduce interception of non-Newfoundland origin salmon. In 1990, to achieve conservation targets in Western Newfoundland and Southern Labrador rivers, commercial quotas were introduced in SFA's 13 and 14. The 1990 management plan was a new initiative, therefore, a separate comparison is made of 1991 catches and those in 1990.

Counts of migrating salmon at the Torrent River fishway and the counting fence on Western Arm Brook were obtained by Marine and Anadromous Fish Division and Conservation and Protection Branch personnel (Gulf Region). Similar to previous years, Torrent River fishway was operated from 26 June to 23 October and Western Arm Brook counting fence was operated from 28 May to 28 October. Western Arm Brook has been closed to angling since 1989 and angling on Torrent River was permitted only below the fishway, after 1000 salmon had moved through.

The effect of migration timing on fisheries harvests and counting facility returns was examined by relating run-timing in 1984-1991 to the percent change in landings and counting facility returns from the previous five year mean. Run-timing and percentage change from the previous five years were determined for 1984-1991 commercial and recreational fisheries in each Salmon Fishing Area; for adult salmon returns to Torrent River fishway and smolt counts at Western Arm Brook counting fence. For example, run-timing to the 1984, SFA 13 commercial fishery, was examined relative to the percent change in 1984 landings from the 1979-1983 mean. Run-timing was taken as the standardized week in which 50% of the cumulative harvest was taken or in which 50% of the cumulative count occurred. Standardized week one is always January 1-7.

## HARVEST SUMMARIES

### Gulf Region, Western Newfoundland Newfoundland and Southern Labrador

The commercial salmon fishery quota in SFA 13 was caught on 6 July but the SFA 14(A) and SFA 14(B) quotas were not caught. These areas remained open until the end of the season, 15 October.

Commercial landings in 1991 totalled 80.5 t. With 16.5 t of Southern Labrador landings (Table 3) deducted from the Northern Labrador quota, total Gulf, Western Newfoundland and Southern Labrador landings were 85% of the total 75 t quota. Insular Newfoundland, total landings were 78% of the total quota.

Numbers of small ( $\leq 2.7$  kg) and large ( $> 2.7$  kg) salmon landed during the 1991 commercial fishery were similar to those in 1990. Compared to the previous 5 and 10 year means, however, when seasons were similar to 1991, catches of small salmon were down approximately 35% and catches of large salmon were down 60% (Table 4).

The percentage of small salmon in 1991 commercial catches was above that in 1990 and long-term means (Table 4); suggesting increased recruitment of small salmon in 1991 relative to previous years. Higher recruitment of small salmon suggests the potential for increased recruitment of large salmon in 1992. Large salmon recruited to the fishery in 1992 will be from the same smolt migration as small salmon recruits in 1991.

The largest commercial harvests of small salmon were in the Coastal Areas of St. George Central, Flat Bay, and St. George North, which comprise Bay St. George in SFA 13 (Figure 3). Together, they produced 44% of the Region's small salmon harvests (Tables 5). The greatest harvests of large salmon were in the Coastal Areas comprising Southern Labrador (Table 6). Southern Labrador produced 74 % of all large salmon catches. Bay St. George and Southern Labrador had 59 and 58 licensed fishermen, respectively, in 1991, indicating similar potential fishing effort in the two areas.

The recreational season bag limit was reduced by 5 fish (33%) from 1990 but the effect on catches and effort is difficult to assess because there were no limits placed on the total number of licenses issued. Recreational catch and effort in 1991 were below those of 1990 and the previous 5, 10 and 15 year means (Table 7), in spite of low commercial catches. Angling effort, however, in rod-days, was only 10% below 1990 and long-term means.

Low water conditions later in the season had a negative effect on total recreational catch and effort because seven rivers were closed due to low water levels in 1991 (Table 2). Only one was closed in 1990 (Mullins and Jones 1991). The average water level for the season, however, was moderate in all areas (Table 8, 9, 10, 11).

Recreational catch-per-unit-effort (CPUE) was below that of 1990 (Table 7), suggesting that lower catches were a result of low abundance in 1991. CPUE also showed progressively greater reductions relative to longer term means, suggesting declining river escapements in recent years.

Similar trends in recreational catches and effort occurred in Insular Newfoundland during 1991 (Figure 4, 5). CPUE, including hooked and released large salmon, was below 1990 and the previous 5, 10 and 15 year means (Table 7).

The largest recreational catch of small salmon in the region was from Grand Codroy River (Table 12), followed, to the north, by Humber River and River of Ponds. The largest hook and release catch of large salmon in the region was from Portland Creek in SFA 14(A). Angling of large salmon on Portland Creek was 56% greater than in the previous 5 years. The largest number of large salmon retained was from Pinware River in SFA 14(B). Pinware River catches of large salmon, in contrast to Portland Creek, were below the previous 5 year mean.

## **Salmon Fishing Area 12**

Recreational catches and effort have increased since the 1984 closure of the commercial fishery in this area (Figure 6, Table 13). Effort, however, has increased more than catch. The average total salmon catch after the commercial closure increased by only 44% while the average angling effort increased by 71%. The resulting CPUE in 1984-1990 was 16% below the 1976-1983 average, suggesting that the number of salmon available to anglers in this area has not increased with angler expectations due to closure of the commercial fishery.

Recreational catch-per-unit-effort in 1991 was 44% below the average for 1984-1990, indicating the second lowest returns since closure of the commercial fishery. Angling catches of small and large salmon were more similar to catches prior to 1984 (Figure 6), while, angling effort was similar to recent years (Table 7, 13).



The largest recreational catch of small salmon in the area in 1991 was from LaPoile River (Table 12). Only LaPoile River yielded increased catches from 1990 and the previous 5 year mean. The percentage of small relative to large salmon angled in 1991 was only 4% more than in 1990 and similar to long-term means (Table 13).

### **Salmon Fishing Area 13**

The 1991 commercial quota in Salmon Fishing Area 13, which represented 48% of the average catch in 1978-1989, prior to quota introduction was not caught until only one week before the season closed in those years (Table 1). The 25 t quota was 10 t lower than that introduced in 1990 but the season duration and licensed commercial effort in 1991 were similar to those in 1978-1989, prior to the introduction of quotas. Low commercial catches in 1991, therefore, suggest lower availability of salmon to the fishery in Salmon Fishing Area 13 relative to previous years.

Commercial catches of large salmon in Salmon Fishing Area 13, however, were lower relative to 1990 and long-term means than small salmon catches (Figure 7; Table 6, 14). Landings of large salmon were 70-80% below 1990 and long-term means, whereas, landings of small salmon were only 6% below those in 1990, 34% below the previous 5 year mean and 15% below the previous 10 year mean. The increase in the proportion of small salmon in 1991 landings from 1990, suggests better recruitment in 1991.

The proportional increase in landings of small salmon occurred mainly in the southern part of the area (Bay St. George), Statistical Area K (Table 4). Area K small salmon were 21% above 1990 and 16% above the previous 10 year mean. The percentage of small salmon also increased in salmon catches from Statistical Area L (primarily Bay of Islands) in 1991, however, small and large salmon catches were approximately 60-80% below those in 1990 and long-term means in that area.

Area K traditionally produced 63% of small Salmon Fishing Area 13 commercial small salmon (Table 15) but in 1991 87% of the landings were in this area. Area L produced 30% of the small salmon in 1990 and 37% in six years prior to quota introduction (Table 16) but only 13% in 1991. Fishermen contend a earlier run-timing in Area K results in the largest portion of the quota being harvested in that area. However, run-timing in 1991 was the same for both areas, indicating lower returns to Area L was the reason for lower catches.

Year	Run-time (standardized week)	
	Area K	Area L
1991	26	26
1990	25	26
1989	25	25
1988	26	26
1987	25	26
1986	25	26
1985	26	27
1984	25	26
Average (1984-90)	25	26

Recreational fishery river quotas in 1991 were taken on four of six rivers under quota management in Salmon Fishing Area 13 (Table 2). Total recreational catches in the area, however, were below previous years; indicating low returns in 1991. Angling effort was similar to 1990 and long-term means (Table 7).

The proportion of small relative to large salmon caught in the Salmon Fishing Area 13 recreational fishery, however, was 7% higher than in 1990 and previous long-term means (Table 17). This increase was due primarily to an increase in catches of small salmon on Area K (Table 7, 18) rivers. Many rivers in Area K, particularly Little Barachois River and Southwest and Bottom Brook (Table 12), had increased landings of small salmon in 1991. The number of small salmon angled on the Grand Codroy River, for example, was 16% above 1990 and 17% above the previous 5 year mean. In contrast, catches on Area L rivers, were about 50% below those in 1990 and the previous long-term means (Table 7, 19), indicating lower river escapements than in Area K. Catches on the Humber River in Area L, for example, decreased by approximately 50% in 1991 from those in previous years (Table 12).

In spite of the reduction in the commercial quota and the increase in recreational catches of small salmon in Statistical Area K, the total recreational catch in Salmon Fishing Area 13 did not show a significant improvement in 1991. Recreational catches of both small and large salmon were below most levels in recent years (Figure 7).

## **Salmon Fishing Area 14(A)-Northern Peninsula**

The 1991 Salmon Fishing Area 14(A) commercial quota represented 89% of the average catch (1978-1989), before quota introduction. Only 51% of the quota was caught in 1991 (Table 20) resulting in a longer season than in 1990 but one similar to pre-quota seasons in 1984-1989 (Table 1). (NOTE: The change in closing date from week 52 to week 42 in 1986-1989 does not appear to have significantly affected catches since 75% of cumulative landings were usually caught before week 32 (Figure 10)).

Conclusions regarding stock abundance based on low 1991 commercial harvests, however, must be made with caution because 1991 commercial fishing effort was affected by inshore ice conditions. The first salmon were not landed in most Coastal Areas until week 26 (Table 5, 6), whereas, landings in 1990, more typically, started from week 23 (Mullins and Jones 1991). Total catches in 1991 were about 10% below 1990 and 50% or greater below all previous long-term means (Table 4) including the mean catch in 1984-1989, prior to quota introduction (Figure 8).

Statistical Areas M and N produced 90% of Salmon Fishing Area 14(A) commercial landings in 1991 (Table 20, 21, 22). Area M landings were 31% below those in 1990, whereas, landings in Area N were 10% above those in 1990 (Table 4). Area M also showed a decrease from 1990 in the proportion of small salmon in commercial landings. This was in contrast to the large increase in the proportion of small salmon present in Salmon Fishing Area 13 total landings.

Commercial catches of small salmon in Statistical Area A(01) in 1991 were also decreased in relation to large salmon (Table 23). This trend relative to 1990 was also present in Southern Labrador catches (Table 4).

Recreational fishing effort in Salmon Fishing Area 14(A) during 1991 was approximately 15% below that in 1990 and long-term means (Table 7). River water conditions may have contributed to the effort reduction in 1991. Water levels were moderate on average but were high early in the season and low later in the season (Table 10) which may have resulted in lower effort. Three smaller rivers were also closed due to low water levels as the season progressed (Table 2).

Recreational quotas were taken on all Salmon Fishing Area 14(A) rivers under quota management in 1991 (Table 2). Catches of small salmon, in contrast to 1990 (Mullins and Jones 1991), however, did not increase in response to the lower commercial harvests (Table 7). Landings remained approximately 29% below those in 1990 and all previous long-term means (Table 7, 24). However, catches on some rivers were suggestive of improvements in stock abundance.

Angling catches of small salmon in Statistical Area M were slightly above previous 10 and 15 year means (Table 7, 25). This increase was due, primarily, to catches on Trout River, Parsons Pond River and Little Brook Ponds (Table 12), and indicates some improvements in river escapements in 1991. In Areas N and A(01), however, angling catches indicated a decrease in returns (Table 26, 27).

The number of large salmon hooked and released in Salmon Fishing Area 14(A) in 1991 was 14% less than in 1990 but was 18-27% above previous 5 and 10 year means (Table 7). Catches of large salmon were also slightly above the 1984-1989 average (Figure 8), prior to the commercial quota introduction. This increase was due, primarily, to increased catches in Statistical Area M on Portland Creek (Table 12). Portland Creek, which was traditionally recognized for angling of large salmon, had the greatest catch of large salmon of either Salmon Fishing Area 14(A) or 14(B) in 1991. This increase was consistent with the increase in the proportion of large salmon in commercial harvests in the area in 1991 relative to long-term means (Table 4).

The proportion of small salmon in 1991 recreational catches was similar to 1990, 5 and 10 year means, but 7% above the previous 15 year mean (Table 24).

#### **Salmon Fishing Area 14(B)-Southern Labrador**

Commercial harvests of small and large salmon in Southern Labrador were greater than those in 1990 (Table 4, 28). This increase, however, was the result of a longer season than in 1990. The 1990 season closed in week 31, when the quota was caught (Mullins and Jones 1991) but in 1991 15% of the small and 43% of large salmon were taken after week 31 (Table 5, 6). The 1991 season was similar to seasons in 1978-1989, prior to quota introduction (Table 1). Compared to mean catches in 1978-1983 and 1984-1989 (Figure 9), catches in 1991 indicated a low stock abundance.

Recreational fishing effort in 1991 was 21% below that in 1990, however, catches of small salmon were above those in 1990 (Table 7, 29) resulting in a 30% increase in catch-per-unit-effort. Catches of large salmon were reduced relative to 1990. According to local outfitters anglers can monitor the three rivers in Southern Labrador from highway bridges and fishing does not usually start until salmon are spotted entering the rivers (A. Mahar, Labrador Salmon Lodge Ltd., Forteau Labrador, personal communication). The only other contribution to reduced effort in 1991 was the closure of Trout River, a tributary of Pinware River, due to low water levels later in the season (Table 2). A later run-timing in 1991 (Figure 10) may have increased the number of salmon entering at one time and resulted in higher catch-per-unit-effort. The increase in catch-per-unit effort from 1990, therefore, is not reflective of greater salmon abundance in 1991.

Recreational catches of small salmon, however, were approximately 15% below the previous 10 and 15 year means but effort was similar to those means (Table 7). Hence, the abundance of small salmon in 1991 has not improved, relative to historical levels.

Recreational catches of large salmon which started to decline in 1989, showed no signs of improvement in 1991 (Figure 9; Table 29). Catches of large salmon on the Pinware River, as with other Southern Labrador rivers, were down by 50% from 1990 and approximately 70% from the previous 5 years (Table 7).

The number of anglers in Southern Labrador has increased steadily since 1985 (Table 29) due to the attraction of retaining large salmon. The decline in catches of large salmon since 1989, however, does not appear to have been a direct result of increased angling pressure. Assuming an average smolt age in SFA 14(B) of 4.0 years, similar to Western Arm Brook, SFA 14(A), reduced catches as a result of any over-exploitation starting in 1985, would not have been expected until 1991. Concern over this decline has been expressed by DFO river guardians as well as local outfitters who have recommended a reduction in the bag limit for large salmon to one or zero. It is recommended that a more accurate assessment of the abundance of large salmon be carried out with the development of an index counting facility in Southern Labrador.

## INDEX RIVERS

### Torrent River

Returns of small salmon to Torrent River fishway in 1991, relative to 1990 (Table 30), were consistent with decreased catches of small salmon in the Salmon Fishing Area 14(A) recreational fishery relative to 1990 (Table 7). Returns to the fishway were 38% less than those in 1990 and approximately 31-36% less than in the previous 5 and 10 year means.

Returns of large salmon to the fishway in 1991, however, did not show a large reduction relative to 1990 or to the previous five year mean (Table 30). Similar to Statistical Area M recreational catches in 1991, counts of large salmon at Torrent River fishway were above the average for the previous five years (Table 7).

### Western Arm Brook

The number of small salmon enumerated at the counting fence on Western Arm Brook in 1991 was 27% below 1990, 38% below the previous 5 year mean and 47% below the previous 10 year mean (Table 31). The low returns in 1991 were consistent with lower counts of small salmon at Torrent River fishway and with lower recreational catches of small salmon in Salmon Fishing Area 14(A) relative to 1990 and in relation to averages for previous years.

The number of smolts counted at Western Arm Brook, however, were 27% greater than in 1990 and only 6-7% less than the previous 5 and 10 year means (Table 31) suggesting the potential for increased adult returns in 1992.

## RUN-TIMING

Run-timing in 1991 commercial and recreational fisheries was later by up to two weeks from the 1984-1990 median run-timing (Figure 10, 11). Only commercial catches in Salmon Fishing Area 13 failed to show a later run-timing in 1991. Previous to 1991, the latest run-timing in any Western Newfoundland and Southern Labrador fisheries occurred in 1985.

Later run-timing in both 1985 and 1991 commercial and recreational fisheries were coincident with reduced harvests relative to the previous 5 year mean. Figure 12 shows that for commercial small salmon in Salmon Fishing Areas 13 and 14(A) the largest harvest reductions from the previous five year mean occurred in 1985 and in 1991. With the exception of 1989, the

largest reduction in recreational catches also occurred in those years (Figure 13). Recreational catches in 1989 were exceptionally low because low water levels forced the closure of 14 rivers in Western Newfoundland and Southern Labrador (Clayton and Mullins 1990).

Run-timing of small salmon to the Torrent River fishway in 1991 occurred in week 31 (Figure 14). This was two weeks later than the median through the fishway of week 29 in 1984-1990. Previously, the latest run-timing had occurred in 1985. Relative to the average number of small salmon counted in the five previous years, 1985 and 1991 had the lowest fishway returns since 1984 (Figure 15). The exception being 1989 when extreme low water levels may have affected migration through the fishway as it did angling catches.

Western Arm Brook 1991 smolt migrations through the counting fence were two weeks later than those in 1990 and as much as six weeks later than the 1984-1989 median run-timing (Figure 14). The latest previous smolt migrations occurred in 1985.

#### **SYNTHESIS**

Western Newfoundland and Southern Labrador commercial catches of small salmon in 1991 were near the lowest on record since 1974. The lowest previous catch was in 1984 (Figure 4). Catches of large salmon in 1991 were the lowest on record. Because the total commercial quota was not caught in 1991 and the 1991 commercial seasons were essentially the same as prior to quota introductions, these catch reductions suggest a low stock abundance. However, catches in some areas such as Statistical Areas K, did suggest increased recruitment of small salmon in 1991.

Recreational fishing effort in 1991 was only 10% below the average for the last 15 years (Figure 4; Table 7). Total angling catches, however, were approximately 40% below those in the same 15 year period. Because no limits were placed on the number of angling licenses, the effect of the 33% reduction in the season bag limit on catches and effort could not be assessed. Increased recreational catches of small salmon in Statistical Area K and increased numbers of large salmon hooked and released in Statistical Area M, however, indicate improvements in the status of stocks in these particular areas.

Low index river returns of small salmon (Table 30, 31), relative to previous years in Salmon Fishing Area 14(A), suggest that lower fisheries harvests were the result of low stock abundance in 1991. In contrast, the increase in large salmon returns to the Torrent River fishway, relative to the previous five years, suggests increased numbers of large salmon available for spawning in 1991.

Reduced commercial and recreational catches and index river returns in 1991 coincided with a later run-timing of salmon to all Salmon Fishing Areas (Figure 10, 11). It is hypothesized that reduced catches and index river returns indicate low salmon abundance in 1991 and that conditions at sea, which resulted in later run-timing, may also have resulted in reduced survival of salmon returning to the rivers. This hypothesis is supported by similar reductions in fisheries harvests and index river returns, which also coincided with later run-timing in 1985 (Figure 10-15).

Changes in hydrographic conditions, such as sea-surface temperature, can cause salmon to modify their movements. This was demonstrated by Reddin and Shearer (1987) from marine recaptures of salmon tagged as smolts at Sand Hill River, Labrador. Ice cover in the eastern Gulf of St. Lawrence is usually restricted to the Strait of Belle Isle - Northern Peninsula area by mid-May (Dickie and Trites 1983; Matheson 1967) but it persisted well into early summer in SFA 14(A), in 1991. Coastal Areas from St. John Bay and north were showing 80% ice cover as late as 10 June, 1991 (M. Smith, Ice Operations, St. John's, Nfld., personal communication). These conditions could have resulted in a later run-timing and possibly reduced sea survival in 1991.

#### FORECAST

The total harvest of small salmon for Statistical Areas M and N, SFA 14(A), commercial and recreational fisheries in 1991 was predicted to be 16,619 fish (95% CI= 13,845-19,693) (Mullins and Jones, 1991). The actual harvest of 10,590 fish was lower than predicted and outside 95% confidence limits, indicating lower than expected returns in 1991. This prediction was based on a regression of Western Arm Brook smolts in year  $i$ , on total Area M+N commercial and recreational harvests in year  $i+1$ . This method predicts a 1992 total harvest of 19,732 (95% CI= 16,874-22,590) small salmon (Figure 16). The formula for the 1992 prediction is: (Total Commercial and Recreational Harvest, Areas M+N (year  $i+1$ ) = WAB smolts (year  $i$ )  $\times$  1.19 + 3722.65;  $R^2=0.40$ ;  $p < .01$ ). Assuming commercial and recreational seasons remain similar to 1991 and 1984-89, 1992 harvests in Areas M and N should be similar to the 1984-89 mean catch of 18,458 small salmon.



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Table 1. Commercial and recreational seasons, 1974-1991.

SALMON FISHING AREA	MANAGEMENT PLAN YEARS	QUOTA (t)	SEASON (STANDARDIZED WEEKS)
<b>COMMERCIAL FISHERY</b>			
12	1974-1977		20-52
	1978-1983		20-28
	1984-1991		CLOSED
13	1974-1977		20-52
	1978-1983		22-28
	1984-1989		23-28
	1990	35	23-27
	1991	25	23-27
14	1974-1977		20-52
	1978-1983		20-52
	1984-1985		23-52
	1986-1989		23-42
14(A+B)	1990	50	23-28
14(B)	1990	10 (supp.)	29-31
14(A)	1991	35	23-42
14(B)	1991	15	23-42
<b>RECREATIONAL FISHERY</b>			
12	1974-1977		21-37
	1978-1983		25-35
	1984-1989		24-36
	1990		24-36
	1991		23-35
13	1974-1977		21-37
	1978-1983		25-35
	1984-1989		23-35
	1990		23-35
	1991		22-35
14(A)	1974-1977		21-37
	1978-1983		25-35
	1984-1989		25-35
	1990		25-35
	1991		24-35
14(B)	1974-1977		21-37
	1978-1983		22-37
	1984-1989		23-37
	1990		23-37
	1991		23-36

- 1985, anglers required to release salmon  $\geq 63$  cm in all Areas except Southern Labrador.
- 1986, angler season bag limit of 15 salmon.
- 1991, angler season bag limit of 10 salmon.

Table 2. 1991 recreational salmon fishery seasons and local closure variations for Gulf Region, Newfoundland and Labrador scheduled rivers. Names in parentheses refer to river segments.

MAP CODE	RIVER NAME	QUOTA <sup>1</sup>	SEASON OPEN	CLOSED	CLOSURE DATE
<u>SFA 12</u>					
1	East Bay Brook		June 8	Sept. 2	
2	LaPoile River		June 8	Sept. 2	
3	Farmer's Arm River		June 8	Sept. 2	
4	Garia River		June 8	Sept. 2	
5	Northwest Brook, Garia Bay		June 8	Sept. 2	
6	Burnt Island River		June 8	Sept. 2	
7	Isle aux Morts River		June 8	Sept. 2	
8	Grand Bay River		June 8	Sept. 2	
9	Northwest Brook, Grand Bay		June 8	Sept. 2	
<u>SFA 13</u>					
Statistical Area K					
11	Bear Cove River		June 8	Sept. 2	
12	Little Codroy River		June 22	Sept. 2	
13	Grand Codroy River (Main)		June 1	Sept. 2	
	Grand Codroy River (South)		June 1	Sept. 2	
	Grand Codroy River (North)		June 1	Sept. 2	
14	Highlands River			Closed	
15	Crabbe's River		June 1	Sept. 2	
16	Barachois River	175	June 1	Sept. 2	
17	Robinson's River		June 1	Sept. 2	
18	Fischell's Brook <sup>5</sup>	200	June 1	Sept. 2	Aug. 16
19	Flat Bay Brook <sup>2</sup>	250	June 1	Sept. 2	Aug. 9
20	Little Barachois Brook		June 22	Sept. 2	
21	Southwest & Bottom Brooks		June 1	Sept. 2	
22	Harry's River (Low. & Mid.) <sup>2</sup>	350	June 22	Sept. 2	July 25
	Harry's River (Pinchgut) <sup>2</sup>		June 22	Sept. 2	July 25
	Harry's River (Home Pool) <sup>2</sup>		June 22	Sept. 2	July 25
	Harry's River (Stag Pond) <sup>2</sup>		June 22	Sept. 2	July 25
Statistical Area L					
23	Fox Island River <sup>2</sup>	50	June 15	Sept. 2	Aug. 9
24	Serpentine River (Lower) <sup>2</sup>	150	June 1	Sept. 2	July 26
	Serpentine River (Upper) <sup>2</sup>		June 1	Sept. 2	July 26
25	Cook's Brook		July 29	Sept. 2	
26	Humber River (Lower incl. D. Lake)		June 1	Sept. 2	
	Humber River (Deer Lake) <sup>3</sup>		June 1	Sept. 2	

(continued next page)

Table 2. (continued)

MAP CODE	RIVER NAME	QUOTA <sup>1</sup>	SEASON OPEN	CLOSED	CLOSURE DATE
	Humber River (Harriman's)		June 1	Sept. 8	
	Humber River (Little Falls)		June 1	Sept. 8	
	Humber River (Big Falls)		June 1	Sept. 8	
	Humber River (Adies Stream)		June 1	Sept. 2	
	Humber River (Adies Lake) <sup>7</sup>		June 1	Sept. 2	Aug. 2
	Humber River (Taylor's Bk.)		June 1	Sept. 2	
27	Hughes Brook		Closed		
28	Goose Arm River		June 22	Sept. 2	

SFA 14(A)

## Statistical Area M

29	Trout River		June 15	Sept. 2	
30	Lomond River <sup>2</sup>	350	June 15	Sept. 2	July 25
31	Deer Arm River		June 15	Sept. 2	
32	Western Brook		Closed		
33	Parsons Pond River		June 15	Sept. 2	
34	Portland Creek (Main)		June 15	Sept. 8	
	Portland Creek (Upper)		June 15	Sept. 8	
	Portland Creek Feeder		June 15	Sept. 2	
-	Bound Brook		Closed		
35	River of Ponds (Lower)		June 15	Sept. 2	
	River of Ponds (Upper)		June 15	Sept. 2	
	River of Ponds (Bluey)		June 15	Sept. 2	
36	Little Brook Ponds		June 15	Sept. 2	
37	Torrent River <sup>4</sup>		Aug. 14	Sept. 2	
38	East River, Hawkes Bay <sup>5</sup>		June 15	Sept. 2	Aug. 16

## Statistical Area N

39	Castor River		June 15	Sept. 2	
40	St. Genevieve River (Lower)		June 1	Sept. 2	
	St. Genevieve River (Falls)		June 1	Sept. 2	
	St. Genevieve River (Upper) <sup>6</sup>		June 1	Sept. 2	
41	Western Arm Brook		Closed		
42	Eastern Arm Brook		June 15	Sept. 2	
44	Big Brook (Lower) <sup>5</sup>		June 15	Sept. 2	Aug. 13
	Big Brook (Upper) <sup>5</sup>		June 15	Sept. 2	Aug. 13
45	Watson's Brook <sup>5</sup>	50	June 15	Sept. 2	Aug. 13

(continued next page)

Table 2. (continued)

MAP CODE	RIVER NAME	QUOTA <sup>1</sup>	SEASON OPEN	CLOSED	CLOSURE DATE
Statistical Area A(01)					
46	Pincent's Brook <sup>5</sup>	10	June 15	Sept. 2	Aug. 18
47	Parker River <sup>5</sup>		July 27	Sept. 2	Aug. 9
48	Bartlett's Brook		June 15	Sept. 2	
49	Upper Brook		June 15	Sept. 2	
50	East River, Pistolet Bay		June 15	Sept. 2	
<u>SFA 14(B)</u>					
51	Forteau River		June 8	Sept. 8	
52	L'Anse-au-Loup Brook		June 8	Sept. 8	
53	Pinware River		June 8	Sept. 8	
	Pinware River (Trout River) <sup>5</sup>		June 8	Sept. 8	Aug. 9

1 Quotas apply to the total catch of one-sea-winter

2 Closure due to quota taken.

3 North Brook closed.

4 River open to angling after 1000 salmon had passed through the fishway.

5 Closure due to low water levels.

6 Closure of Ten-Mile Feeder Brook for conservation.

7 Closure of Adies Lake for conservation.

Table 3. Commercial harvests of small and large Atlantic salmon for Area O(50), 1991. Section 50(b) catch were taken from Newfoundland Region quota. Weight in kilograms.

Section	Community	Small		Large		Total		% of Area	
		Weight	Number	Weight	Number	Weight	Number	Weight	Number
50(a)	Lance au Clair	77	35	765	149	843	185	2.5	1.9
	Lanse au Amour	170	78	1385	270	1556	348	4.6	3.6
	Lance au Loup	748	337	2275	445	3023	781	8.9	8.0
	Capstan Islands	8	4	203	40	212	43	0.6	0.4
	West St. Modest	373	172	922	184	1295	356	3.8	3.7
	Pinware	89	41	1022	199	1112	240	3.3	2.5
	Red Bay	1815	834	3545	705	5360	1539	15.8	15.8
	Henley Harbour	1712	901	2350	456	4062	1357	11.9	14.0
	Sub-Total:	4992	2402	12467	2448	17463	4849	51.4	49.9
50(b)	Carrols Cove	489	225	851	165	1340	390	3.9	4.0
	Chimney Tickle	0	0	0	0	0	0	0.0	0.0
	Cape Islands	2701	1229	4300	827	7001	2056	20.6	21.2
	Pleasant Harbou	0	0	0	0	0	0	0.0	0.0
	Cape Charles	3207	1448	4996	977	8203	2426	24.1	25.0
	Sub-Total:	6397	2902	10147	1969	16544	4872	48.6	50.1
Total:		11389	5304	22614	4417	34007	9721	100.0	100.0

Table 4. Percentage change in number of salmon caught in 1991 commercial fishery from 1990 and previous 5 and 10 year means. '+' indicates percent increase and '-' indicates percent decrease in catches.

AREA	1991	SMALL % CHANGE			1991	LARGE % CHANGE			1991	TOTAL % CHANGE			1991	PERCENT SMALL % CHANGE		
		1990	5	10		1990	5	10		1990	5	10		1990	5	10
GULF	28,549	-1	-41	-30	5,962	-13	-55	-63	34,511	-3	-44	-39	82.7	+2	+5	+15
INS. NFLD	23,246	-8	-43	-32	1,545	-61	-79	-85	24,791	-15	-48	-44	93.8	+9	+11	+21
13	15,687	-6	-34	-15	872	-73	-81	-76	16,559	-17	-42	-25	94.7	+13	+13	+15
K	13,637	21	-10	+16	615	-75	-82	-77	14,252	+3	-24	-1	95.7	+17	+18	+18
L	2,050	-62	-77	-69	257	-66	-78	-75	2,307	-62	-77	-70	88.9	+2	+1	+4
14(A)	7,559	-12	-54	-49	673	-10	-76	-72	8,232	-12	-57	-52	91.8	-0	+7	+7
M	3,248	-33	-60	-57	319	-3	-81	-77	3,567	-31	-63	-60	91.1	-3	+10	+10
N	3,812	15	-49	-42	191	-42	-80	-77	4,003	+10	-53	-46	95.2	+5	+7	+8
A(01)	499	+10	-45	-32	163	+85	-28	-5	662	+22	-42	-27	75.4	-10	-6	-7
14(B)	5,303	+48	-33	-20	4,417	+55	-23	-26	9,720	+51	-28	-23	54.6	-2	-7	+5

Table 5. Number of small salmon harvested in Coastal Areas of the Gulf Region, Newfoundland and Labrador commercial fishery, 1991, from purchase slip and supplementary 'B' data.

Coastal Area	Week																				Percent	
	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	Total	SFA
Codroy	0	71	107	424	346	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	948	6.0
St. George Central	332	257	668	1380	1641	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4278	27.3
Flat Bay	293	410	573	1050	1800	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4126	26.3
St. George N.	161	302	572	691	2560	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4286	27.3
Port au Port Pen.	2	2	2	7	26	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	39	0.2
Port au Port Bay	0	0	0	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	0.0
Bear Head	0	0	0	1	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	0.0
Bay of Island S.	0	.	46	66	32	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	144	0.9
Humber Arm	41	57	54	168	585	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	905	5.8
North Arm	1	10	114	370	463	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	958	6.1
SFA 13 Total:	830	1109	2136	4158	7455	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15689	100.0
Trout River	8	9	9	25	119	119	119	119	43	13	13	13	9	1	1	1	1	.	.	.	622	4.8
Bonne Bay	10	12	12	95	45	207	45	45	20	125	10	10	7	1	1	1	1	.	.	.	647	5.0
Gros Morne S.	15	17	17	19	33	33	33	33	40	43	43	43	32	3	3	3	3	.	.	.	413	3.2
Gros Morne N.	5	6	6	18	525	93	93	93	28	2	2	2	1	.	.	.	.	.	.	.	874	6.8
Parson's - Portland	.	.	.	6	41	41	41	41	20	11	11	11	8	.	.	.	.	.	.	.	231	1.8
Ponds - Bellburns	.	.	.	1	6	6	6	6	2	.	.	.	.	.	.	.	.	.	.	.	27	0.2
Spirity - Saunders	.	.	.	.	156	61	.	.	36	50	50	50	36	.	.	.	.	.	.	.	439	3.4
St. John Bay S.	.	.	.	38	259	265	270	286	107	44	44	44	31	.	.	.	.	.	.	.	1388	10.8
St. John Bay N.	.	.	.	0	0	0	2	0	0	.	.	.	.	.	.	.	.	.	.	.	2	0.0
Margaret - Brig	1	1	1	1	40	32	149	176	31	13	13	13	9	.	.	.	.	.	.	.	480	3.7
Genevieve - Barbe	.	.	.	20	142	142	142	142	44	5	5	5	3	.	.	.	.	.	.	.	650	5.1
St. Barbe N.	.	.	.	11	79	82	431	198	80	70	70	70	60	36	36	36	36	.	.	.	1295	10.1
Pistolet Bay	.	.	.	.	.	58	0	16	78	27	24	9	7	.	86	.	.	.	.	.	305	2.4
Hay Cove	.	.	.	0	2	2	2	22	7	18	9	9	14	26	26	26	26	.	.	.	189	1.5
Southern Lab.	.	.	0	4	25	404	2627	1083	327	177	210	151	76	31	47	27	63	39	11	1	5303	41.2
SFA 14 Total:	39	45	45	238	1472	1545	3960	2260	863	598	504	430	293	98	200	94	130	39	11	1	12865	100.0
REGION Total:	869	1154	2181	4396	8927	1546	3960	2260	863	598	504	430	293	98	200	94	130	39	11	1	28554	



Table 6. Number of large salmon harvested in Coastal Areas of the Gulf Region, Newfoundland and Labrador commercial fishery, 1991, from purchase slip and supplementary 'B' data.

Coastal Area	Week																			Percent		
	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	Total	SFA
Codroy	9	48	117	105	45	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	324	37.2
St. George Central	51	25	38	37	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	158	18.1
Flat Bay	47	11	15	5	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	83	9.5
St. George N.	3	3	17	10	17	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	50	5.7
Port au Port Pen.	0	0	0	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0
Port au Port Bay	0	0	0	0	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0
Bear Head	1	3	1	5	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	13	1.5
Bay of Island S.	10	.	19	6	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	35	4.0
Humber Arm	0	18	17	8	11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	54	6.2
North Arm	21	37	60	25	12	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	155	17.8
<b>SFA 13 Total:</b>	<b>142</b>	<b>145</b>	<b>284</b>	<b>201</b>	<b>97</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>872</b>	<b>100.0</b>
Trout River	0	5	0	6	116	0	0	0	0	1	0	0	0	0	0	0	0	.	.	.	128	2.5
Bonne Bay	1	23	1	7	3	32	3	3	1	2	0	0	0	0	0	0	0	.	.	.	76	1.5
Gros Morne S.	2	2	2	3	5	5	5	5	1	0	0	0	0	0	0	0	0	.	.	.	30	0.6
Gros Morne N.	2	2	2	3	7	7	7	7	2	0	0	0	0	.	.	.	.	.	.	.	39	0.8
Parsons - Portland	.	.	.	0	3	3	3	3	2	1	1	1	1	.	.	.	.	.	.	.	18	0.4
Ponds - Bellburns	.	.	.	0	1	1	1	1	0	.	.	.	.	.	.	.	.	.	.	.	4	0.1
Spirity - Saunders	.	.	.	.	7	3	.	.	2	3	3	3	2	.	.	.	.	.	.	.	23	0.5
St. John Bay S.	.	.	.	2	18	13	35	12	5	2	2	2	1	.	.	.	.	.	.	.	92	1.8
St. John Bay N.	.	.	.	0	5	1	1	2	1	.	.	.	.	.	.	.	.	.	.	.	10	0.2
Margaret - Brig	1	1	1	2	26	13	4	7	2	0	0	0	0	.	.	.	.	.	.	.	57	1.1
Genevieve - Barbe	.	.	.	0	0	0	0	0	0	0	0	0	0	.	.	.	.	.	.	.	0	0.0
St. Barbe N.	.	.	.	0	3	4	11	11	1	0	0	0	0	0	0	0	0	.	.	.	30	0.6
Pistolet Bay	.	.	.	.	.	24	7	2	80	10	4	0	0	.	2	.	.	.	.	.	129	2.5
Hay Cove	.	.	.	0	0	0	0	1	1	28	1	1	1	0	0	0	0	.	.	.	33	0.6
Southern Lab.	.	.	11	6	44	430	1404	491	130	69	186	114	221	422	174	175	156	159	205	22	4419	86.9
<b>SFA 14 Total:</b>	<b>6</b>	<b>33</b>	<b>17</b>	<b>29</b>	<b>238</b>	<b>536</b>	<b>1481</b>	<b>545</b>	<b>228</b>	<b>116</b>	<b>197</b>	<b>121</b>	<b>226</b>	<b>422</b>	<b>176</b>	<b>175</b>	<b>156</b>	<b>159</b>	<b>205</b>	<b>22</b>	<b>5088</b>	<b>100.0</b>
<b>REGION Total:</b>	<b>148</b>	<b>178</b>	<b>301</b>	<b>230</b>	<b>335</b>	<b>539</b>	<b>1481</b>	<b>545</b>	<b>228</b>	<b>116</b>	<b>197</b>	<b>121</b>	<b>226</b>	<b>422</b>	<b>176</b>	<b>175</b>	<b>156</b>	<b>159</b>	<b>205</b>	<b>22</b>	<b>5960</b>	

Table 7. Percentage change in number of salmon caught in the 1991 recreational harvests and percentage differences from 1990 and previous

AREA	ROD-DAY % CHANGE					SMALL <63 cm % CHANGE					LARGE >63 cm % CHANGE					CATCH/EFFORT % CHANGE				
	1991	1990	5	10	15	1991	1990	5	10	15	1991	1990	5	10	15	1991	1990	5	10	15
GULF	41656	-10	-11	-10	-8	10549	-23	-21	-25	-26	385	-36	-42	-45	-56	0.26	-16	-13	-19	-24
INS. NFLD	37639	-9	-10	-11	-9	9397	-25	-22	-26	-27	336	-33	-33	-39	-50	0.26	-19	-13	-19	-21
12	2761	-10	-8	-7	+12	644	-25	-30	-41	-29	15	-50	-40	-42	-40	0.24	-17	-25	-35	-37
13	21028	-3	-6	-8	-8	5188	-22	-17	-26	-27	204	-39	-46	-53	-62	0.26	-19	-13	-19	-21
K	12985	-1	-3	-8	-7	3465	+3	+12	-4	-5	147	-41	-40	-55	-64	0.28	0	+12	0	-3
L	8043	-8	-10	-8	-9	1723	-48	-46	-48	-49	57	-36	-58	-47	-53	0.22	-44	-41	-44	-45
14(A)	13850	-16	-16	-15	-13	3565	-29	-26	-24	-27	117	-14	+18	+27	-3	0.27	-16	-10	-7	-16
M	9857	-18	-15	-14	-12	2975	-24	-9	+3	+3	117	-13	+22	+48	+13	0.31	-9	+7	+19	+15
N	2602	-22	-33	-36	-32	555	-46	-62	-68	-71	0	-100	-100	-100	-100	0.21	-32	-45	-50	-59
A(01)	1391	+33	+52	+86	+79	35	-61	-67	-65	-66	0	---	---	-100	-100	0.03	-67	-75	-79	-77
14(B)	4017	-21	-21	-7	+4	1152	+8	-15	-17	-15	49	-50	-69	-68	-76	0.3	+30	0	-17	-25

Numbers of MSW salmon refer to hooked and released fish in insular Newfoundland and retained fish in Southern Labrador.

Table 8. Recreational catch of Atlantic salmon in Gulf Region, Salmon Fishing Area 12, 1991 by standardized week. Symbols for water level are: L=low, M=medium, H=high.

WEEK	WATER LEVEL	ROD DAYS	SMALL < 63 cm	LARGE > 63 cm	TOTAL	CATCH/EFFORT
22	M	0	0	0	0	.
23	M	63	0	0	0	0.00
24	M	113	6	0	6	0.05
25	M	269	32	6	38	0.14
26	L	270	53	5	58	0.21
27	L	264	70	0	70	0.27
28	M	492	201	0	201	0.41
29	M	361	128	3	131	0.36
30	L	299	62	0	62	0.21
31	L	207	27	0	27	0.13
32	M	230	54	0	54	0.23
33	L	156	9	1	10	0.06
34	M	31	2	0	2	0.06
35	M	6	0	0	0	0.00
TOTAL	M	2761	644	15	659	0.24

Numbers of MSW salmon refer to hooked and released fish.

Table 9. Recreational catch of Atlantic salmon in Gulf Region, Salmon Fishing Area 13, 1991 by standardized week. Symbols for water level are: L=low, M=medium, H=high.

WEEK	WATER LEVEL	ROD DAYS	SMALL < 63 cm	LARGE > 63 cm	TOTAL	CATCH/EFFORT
22	H	340	35	36	71	0.21
23	H	542	54	32	86	0.16
24	H	491	36	20	56	0.11
25	M	1012	107	24	131	0.13
26	M	1613	322	18	340	0.21
27	M	2367	649	19	668	0.28
28	M	2694	895	12	907	0.34
29	M	2644	782	14	796	0.30
30	L	2653	612	4	616	0.23
31	L	1866	494	6	500	0.27
32	L	1735	494	2	496	0.29
33	L	1326	286	4	290	0.22
34	M	1028	281	3	284	0.28
35	M	695	134	10	144	0.21
36	H	22	7	0	7	0.32
TOTAL	M	21028	5188	204	5392	0.26

Numbers of MSW salmon refer to hooked and released fish.

Table 10. Recreational catch of Atlantic salmon in Gulf Region, Salmon Fishing Area 14(A), 1991 by standardized week. Symbols for water level are: L=low, M=medium, H=high.

WEEK	WATER LEVEL	ROD DAYS	SMALL < 63 cm	LARGE > 63 cm	TOTAL	CATCH/EFFORT
22	H	0	0	0	0	.
23	H	0	0	0	0	.
24	H	121	2	0	2	0.02
25	H	454	6	0	6	0.01
26	H	935	56	3	59	0.06
27	H	1369	261	6	267	0.20
28	H	1613	447	11	458	0.28
29	M	1545	361	15	376	0.24
30	M	1659	511	16	527	0.32
31	M	1546	515	15	530	0.34
32	L	1420	449	10	459	0.32
33	L	1313	414	17	431	0.33
34	L	877	244	13	257	0.29
35	L	962	291	11	302	0.31
36	M	36	8	0	8	0.22
TOTAL	M	13850	3565	117	3682	0.27

Numbers of MSW salmon refer to hooked and released fish.

Table 11. Recreational catch of Atlantic salmon in Gulf Region, Salmon Fishing Area 14(B), 1991 by standardized week. Symbols for water level are: L=low, M=medium, H=high.

WEEK	WATER LEVEL	ROD DAYS	SMALL < 63 cm	LARGE > 63 cm	TOTAL	CATCH/EFFORT
23	H	123	0	0	0	0.00
24	H	294	0	0	0	0.00
25	H	238	0	0	0	0.00
26	H	219	0	0	0	0.00
27	M	221	1	2	3	0.01
28	M	409	7	0	7	0.02
29	M	448	117	12	129	0.29
30	M	652	541	24	565	0.87
31	L	530	209	8	217	0.41
32	L	339	140	2	142	0.42
33	L	225	67	1	68	0.30
34	L	119	31	0	31	0.26
35	L	115	23	0	23	0.20
36	L	85	16	0	16	0.19
TOTAL	M	4017	1152	49	1201	0.30

Table 12. Percentage change in number of salmon caught in Gulf Region, Newfoundland and Labrador rivers in 1991 from 1990 and 5 year (1986-1990) mean totals. '+' indicates percent increase and '-' indicates percent decrease in 1991 catches.

SFA	AREA	RIVER	ROD-DAYS			SMALL <63 cm			LARGE >63 cm		
			% CHANGE			% CHANGE			% CHANGE		
			1991	1990	5	1991	1990	5	1991	1990	5
12	J2	La Poile River	895	+22	+46	262	+20	+23	8	-58	-46
		Farmers Arm River	186	-47	-34	30	-48	-63	0	.	.
		Garia River	222	+17	-12	74	-24	-28	7	-22	+25
		Northwest River, Garia	95	+20	-43	0	-100	-100	0	.	-100
		Burnt Island River	553	-40	-30	92	-63	-64	0	-100	-100
		Isle aux Morts River	490	+8	-9	87	-22	-32	0	.	-100
		Grand Bay River	320	-3	-8	99	-8	-7	0	.	-100
13	K	Bear Cove River	313	+5	+10	57	+1800	+110	4	.	+400
		Little Codroy River	383	-2	+7	118	+16	+21	0	-100	-100
		Grand Codroy River	5,758	+18	+11	1,452	+16	+17	56	-54	-66
		Crabbes River	385	-16	-36	103	-8	-41	9	-64	-12
		Barachois River	293	-46	-39	68	-51	-49	6	-14	-29
		Robinsons River	818	-31	-44	176	-24	-27	10	-55	-47
		Fischells Brook	414	+62	+9	157	+35	+5	16	+33	+200
		Flat Bay Brook	977	+4	+25	251	-9	+20	2	-67	-29
		Little Barachois Brook	419	+103	+112	145	+480	+179	0	.	-100
		Southwest and Bottom	1,769	+3	+15	568	+45	+70	40	+208	+108
		Harrys River	1,456	-33	-31	370	-48	-17	4	-82	-62
	L	Fox Island River	669	+12	+52	56	-38	-18	0	-100	-100
		Serpentine River	447	+82	+68	132	+1	+30	46	+254	+326
		Cooks Brook	119	+53	+21	12	-29	-14	0	.	-100
		Humber River	5,770	-17	-23	1,431	-53	-52	11	-85	-86
		Goose Arm River	1,038	+20	+80	92	+163	+213	0	.	.
14(A)	M	Trout River	360	-30	+38	23	+21	+379	0	.	.
		Lomond River	1,591	-18	+5	328	-15	-5	10	-41	-53
		Parsons Pond River	431	+36	+46	55	+57	+101	0	.	.
		Portland Creek	3,138	-16	-12	749	-46	-13	106	-1	+56
		River of Ponds	2,881	-22	-27	1,326	-11	-9	0	-100	-100
		Little Brook Ponds	638	+43	+5	203	+60	+50	0	.	.
		Torrent River	438	-30	-34	150	-32	-37	1	-75	-55
		Big East River	380	-51	-47	141	-46	-18	0	-100	-100
	N	Castor River	761	-20	-40	238	-31	-61	0	.	-100
		Ste. Genevieve River	1,381	-16	-23	276	-51	-58	0	.	-100
		Eastern Arm Brook	29	-57	-62	3	-79	-86	0	.	.
		Big Brook	324	-33	-7	32	-57	-62	0	-100	-100
		Watsons Brook	107	-41	-51	6	-83	-85	0	.	.
	A(01)	Pincent's Brook	326	+169	+229	0	-100	-100	0	.	.
		Parker River	499	+11	+83	11	-48	-4	0	.	.
		Bartlett's Brook	188	-2	+37	21	-40	-4	0	.	.
		Upper Brook	269	+41	+35	3	-77	-88	0	.	.
		East River, Pistolet	109	+22	-47	0	-100	-100	0	.	.
14(B)	O(50)	Forteau River	1,161	-8	-21	205	-37	-51	3	-57	-82
		L'Anse-Au-Loup River	604	-16	-28	118	34	-15	1	.	0
		Pinware River	2,252	-27	-18	829	+27	+4	45	-51	-68
GULF REGION TOTALS:			41,656			10,549			385		

Table 13. Total recreational harvest (estimated + observed) of Atlantic salmon in Gulf Region, Salmon Fishing Area 12, 1976–1991.

Year	Effort Rod Days	Small <63 cm	Large >63 cm	Total	Catch/ Effort	Percent Small
<b>Salmon Fishing Area 12</b>						
1976	926	297	5	302	0.33	.
1977	1238	558	48	606	0.49	86.1
1978	1305	366	20	386	0.30	96.5
1979	1711	733	10	743	0.43	97.3
1980	2175	820	29	849	0.39	96.2
1981	2038	1060	17	1077	0.53	98.0
1982	2810	1555	15	1570	0.56	98.6
1983	2648	667	8	675	0.25	99.5
1984	3590	1922	68	1990	0.55	90.7
1985	3722	1097	30	1127	0.30	98.5
1986	3430	938	33	971	0.28	97.1
1987	2212	829	27	856	0.39	97.2
1988	3607	1413	23	1436	0.40	97.3
1989	2657	560	10	570	0.21	99.3
1990	3060	856	30	886	0.29	94.9
1991	2761	644	15	659	0.24	98.3
Mean(86–90)	2993	919	25	944	0.32	97.5
95% CL= +/-	569	385	11	390	0.07	0.9
N	5	5	5	5	5	5
Mean(81–90)	2977	1090	26	1116	0.37	97.7
95% CL= +/-	600	303	12	312	0.08	0.7
N	10	10	10	10	10	10
Mean(76–90)	2475	911	25	936	0.38	97.2
95% CL= +/-	916	247	9	252	0.06	0.8
N	15	15	15	15	15	15

Numbers of MSW salmon from 1985–91 refer to hooked and released fish.  
Percent 1SW is calculated by year of smolt migration.

Table 14. Commercial harvest of small and large Atlantic salmon in Salmon Fishing Area 13, 1974–1991. Weight in kilograms.

Year	Small		Large		Total		Percent Small	
	Weight	Number	Weight	Number	Weight	Number	Weight	Number
<b>Salmon Fishing Area 13</b>								
1974	19784	12858	22886	5009	42670	17867	46.4	72.0
1975	13220	8422	15320	3289	28540	11711	46.3	71.9
1976	24960	15353	20176	4573	45136	19926	55.3	77.1
1977	24199	14633	29361	6482	53560	21115	45.2	69.3
1978	17300	10136	16247	3563	33547	13699	51.6	74.0
1979	23091	13661	8765	1938	31856	15599	72.5	87.6
1980	40230	19554	24826	5234	65056	24788	61.8	78.9
1981	27232	15327	10514	2260	37746	17587	72.1	87.1
1982	19742	11341	11188	2425	30930	13766	63.8	82.4
1983	20336	12431	12227	2936	32563	15367	62.5	80.9
1984	27274	14832	15120	3294	42394	18126	64.3	81.8
1985	18612	10144	13662	2998	32274	13142	57.7	77.2
1986	51465	29675	27859	6704	79324	36379	64.9	81.6
1987	45039	24443	21284	4655	66323	29098	67.9	84.0
1988	57744	32492	19848	4295	77592	36787	74.4	88.3
1989	27729	16499	18523	4189	46252	20688	60.0	79.8
1990	29046	16638	13794	3239	42840	19877	67.8	83.7
1991	24719	15687	3870	872	28589	16559	86.5	94.7
Mean(86–90)	42205	23949	20262	4616	62466	28566	67.0	83.5
95% CL= +/-	16635	9102	6325	1588	21289	10134	6.5	4.0
N	5	5	5	5	5	5	5	5
Mean(81–90)	32422	18382	16402	3700	48824	22082	65.5	82.7
95% CL= +/-	9968	5565	3894	944	13339	6339	3.7	2.4
N	10	10	10	10	10	10	10	10

Table 15. Commercial harvest of small and large Atlantic salmon in Statistical Area K, 1974–1991. Weight in kilograms.

Year	Small		Large		Total		Percent Small	
	Weight	Number	Weight	Number	Weight	Number	Weight	Number
<b>Statistical Area K</b>								
1974	15670	10443	15810	3595	31480	14038	49.8	74.4
1975	8412	5606	11175	2431	19587	8037	43.0	69.8
1976	21277	13307	16460	3748	37737	17055	56.4	78.0
1977	19156	11976	22297	4958	41453	16934	46.2	70.7
1978	11835	7401	11568	2572	23403	9973	50.6	74.2
1979	16871	10550	6576	1462	23447	12012	72.0	87.8
1980	24030	11441	16070	3416	40100	14857	59.9	77.0
1981	18923	11097	6937	1573	25860	12670	73.2	87.6
1982	10425	6466	6477	1432	16902	7898	61.7	81.9
1983	12440	8228	9063	2289	21503	10517	57.9	78.2
1984	16335	9075	8156	1812	24491	10887	66.7	83.4
1985	11903	6613	9731	2162	21634	8775	55.0	75.4
1986	24657	15024	19689	4718	44346	19742	55.6	76.1
1987	28544	16133	17373	3804	45917	19937	62.2	80.9
1988	36498	21824	15307	3235	51805	25059	70.5	87.1
1989	18221	11531	13334	3096	31555	14627	57.7	78.8
1990	18399	11313	10511	2481	28910	13794	63.6	82.0
1991	20824	13637	2636	615	23460	14252	88.8	95.7
Mean(86–90)	25264	15165	15243	3467	40507	18632	61.9	81.0
95% CL= +/-	9498	5317	4405	1047	12202	5679	7.2	5.1
N	5	5	5	5	5	5	5	5
Mean(81–90)	19635	11730	11658	2660	31292	14391	62.4	81.1
95% CL= +/-	5842	3422	3256	750	8540	3973	4.4	3.0
N	10	10	10	10	10	10	10	10



Table 16. Commercial harvest of small and large Atlantic salmon in Statistical Area L, 1974–1991. Weight in kilograms.

Year	Small		Large		Total		Percent Small	
	Weight	Number	Weight	Number	Weight	Number	Weight	Number
<b>Statistical Area L</b>								
1974	4114	2415	7076	1414	11190	3829	36.8	63.1
1975	4808	2816	4145	858	8953	3674	53.7	76.7
1976	3683	2046	3716	825	7399	2871	49.8	71.3
1977	5043	2657	7064	1524	12107	4181	41.7	63.6
1978	5465	2735	4679	991	10144	3726	53.9	73.4
1979	6220	3111	2189	476	8409	3587	74.0	86.7
1980	16200	8113	8756	1818	24956	9931	64.9	81.7
1981	8309	4230	3577	687	11886	4917	69.9	86.0
1982	9317	4875	4711	993	14028	5868	66.4	83.1
1983	7896	4203	3164	647	11060	4850	71.4	86.7
1984	10939	5757	6964	1482	17903	7239	61.1	79.5
1985	6709	3531	3931	836	10640	4367	63.1	80.9
1986	26808	14651	8170	1986	34978	16637	76.6	88.1
1987	16495	8310	3911	851	20406	9161	80.8	90.7
1988	21246	10668	4541	1060	25787	11728	82.4	91.0
1989	9508	4968	5189	1093	14697	6061	64.7	82.0
1990	10647	5325	3283	758	13930	6083	76.4	87.5
1991	3895	2050	1234	257	5129	2307	75.9	88.9
Mean(86–90)	16941	8784	5019	1150	21960	9934	76.2	87.9
95% CL= +/-	9017	4995	2358	606	10820	5503	8.6	4.5
N	5	5	5	5	5	5	5	5
Mean(81–90)	12787	6652	4744	1039	17532	7691	71.3	85.6
95% CL= +/-	4731	2535	1174	295	5518	2761	5.4	2.9
N	10	10	10	10	10	10	10	10

Table 17. Total recreational harvest (estimated + observed) of Atlantic salmon in Gulf Region, Salmon Fishing Area 13, 1976–1991.

Year	Effort Rod Days	Small <63 cm	Large >63 cm	Total	Catch/ Effort	Percent Small
<b>Salmon Fishing Area 13</b>						
1976	32922	10383	626	11009	0.33	.
1977	24474	6712	1049	7761	0.32	90.8
1978	19686	5289	855	6144	0.31	88.7
1979	16383	6009	113	6122	0.37	97.9
1980	21313	7913	993	8906	0.42	85.8
1981	23839	9300	663	9963	0.42	92.3
1982	25246	9566	595	10161	0.40	94.0
1983	25473	6337	610	6947	0.27	94.0
1984	22152	7771	309	8080	0.36	95.4
1985	20137	5302	257	5559	0.28	96.8
1986	25707	7346	691	8037	0.31	88.5
1987	20887	6018	342	6360	0.30	95.6
1988	24356	8217	406	8623	0.35	93.7
1989	18544	3174	129	3303	0.18	98.5
1990	21769	6652	337	6989	0.32	90.4
1991	21028	5188	204	5392	0.26	97.0
Mean(86–90)	22253	6281	381	6662	0.30	94.0
95% CL= +/-	2838	2384	251	2576	0.05	1.7
N	5	5	5	5	5	5
Mean(81–90)	22811	6968	434	7402	0.32	94.2
95% CL= +/-	2482	1372	138	1474	0.04	1.1
N	10	10	10	10	10	10
Mean(76–90)	22859	7066	532	7598	0.33	93.1
95% CL= +/-	3907	1039	162	1110	0.03	1.8
N	15	15	15	15	15	15

Numbers of MSW salmon from 1985–91 refer to hooked and released fish.  
Percent 1SW is calculated by year of smolt migration.

Table 18. Total recreational harvest (estimated + observed) of Atlantic salmon in Gulf Region, Statistical Area K, 1976–1991.

Year	Effort Rod Days	Small <63 cm	Large >63 cm	Total	Catch/ Effort	Percent Small
<b>Statistical Area K</b>						
1976	20964	5121	554	5675	0.27	.
1977	17209	4355	994	5349	0.31	83.7
1978	11084	2327	597	2924	0.26	87.9
1979	7751	2572	84	2656	0.34	96.5
1980	12316	4213	673	4886	0.40	79.3
1981	14311	4911	500	5411	0.38	89.4
1982	15417	5045	469	5514	0.36	91.3
1983	16480	3075	554	3629	0.22	90.1
1984	14783	4847	262	5109	0.35	92.1
1985	12779	2871	246	3117	0.24	95.2
1986	16588	3819	430	4249	0.26	87.0
1987	12346	2807	216	3023	0.24	94.6
1988	14393	3834	230	4064	0.28	92.4
1989	10366	1717	103	1820	0.18	97.4
1990	13062	3357	248	3605	0.28	87.4
1991	12985	3465	147	3612	0.28	95.8
Mean(86–90)	13351	3107	245	3352	0.25	92.5
95% CL= +/-	2322	1097	146	1215	0.03	1.8
N	5	5	5	5	5	5
Mean(81–90)	14053	3628	326	3954	0.28	91.9
95% CL= +/-	1944	773	107	838	0.04	1.8
N	10	10	10	10	10	10
Mean(76–90)	13990	3658	411	4069	0.29	90.2
95% CL= +/-	3198	599	136	673	0.03	2.6
N	15	15	15	15	15	15

Numbers of MSW salmon from 1985–91 refer to hooked and released fish.  
Percent 1SW is calculated by year of smolt migration.

Table 19. Total recreational harvest (estimated + observed) of Atlantic salmon in Gulf Region, Statistical Area L, 1976–1991.

Year	Effort Rod Days	Small <63 cm	Large >63 cm	Total	Catch/ Effort	Percent Small
<b>Statistical Area L</b>						
1976	11958	5262	72	5334	0.45	.
1977	7265	2357	55	2412	0.33	99.0
1978	8602	2962	258	3220	0.37	90.1
1979	8632	3437	29	3466	0.40	99.0
1980	8997	3700	320	4020	0.45	91.5
1981	9528	4389	163	4552	0.48	95.8
1982	9829	4521	126	4647	0.47	97.2
1983	8993	3262	56	3318	0.37	98.8
1984	7369	2924	47	2971	0.40	98.6
1985	7358	2431	11	2442	0.33	99.6
1986	9119	3527	261	3788	0.42	90.3
1987	8541	3211	126	3337	0.39	96.6
1988	9963	4383	176	4559	0.46	94.8
1989	8178	1457	26	1483	0.18	99.4
1990	8707	3295	89	3384	0.39	94.2
1991	8043	1723	57	1780	0.22	98.3
Mean(86–90)	8902	3175	136	3310	0.37	95.7
95% CL= +/-	683	1324	110	1406	0.09	1.6
N	5	5	5	5	5	5
Mean(81–90)	8759	3340	108	3448	0.39	96.9
95% CL= +/-	922	682	56	721	0.05	1.1
N	10	10	10	10	10	10
Mean(76–90)	8869	3408	121	3529	0.40	96.5
95% CL= +/-	1196	535	53	555	0.04	1.4
N	15	15	15	15	15	15

Numbers of MSW salmon from 1985–91 refer to hooked and released fish.

Percent 1SW is calculated by year of smolt migration.

Table 20. Commercial harvest of small and large Atlantic salmon in Salmon Fishing Area 14(a)\*, 1974–1991. Weight in kilograms.

Year	Small		Large		Total		Percent Small	
	Weight	Number	Weight	Number	Weight	Number	Weight	Number
<b>Salmon Fishing Area 14(A) *</b>								
1974	15827	9476	7658	1539	23485	11015	67.4	86.0
1975	18576	11034	11752	2471	30328	13505	61.3	81.7
1976	30444	17442	9308	2087	39752	19529	76.6	89.3
1977	16344	9277	17567	3823	33911	13100	48.2	70.8
1978	17154	8877	9596	2031	26750	10908	64.1	81.4
1979	36210	19597	7172	1602	43382	21199	83.5	92.4
1980	28286	13874	14175	3031	42461	16905	66.6	82.1
1981	27963	16010	13166	2737	41129	18747	68.0	85.4
1982	33711	17981	8263	1934	41974	19915	80.3	90.3
1983	29210	16113	9421	2121	38631	18234	75.6	88.4
1984	11308	6034	9874	2098	21182	8132	53.4	74.2
1985	17219	9275	3855	823	21074	10098	81.7	91.8
1986	23601	13245	14911	3629	38512	16874	61.3	78.5
1987	48332	25241	16464	3713	64796	28954	74.6	87.2
1988	43090	22941	15337	3336	58427	26277	73.8	87.3
1989	23136	12463	11520	2703	34656	15166	66.8	82.2
1990	17020	8622	3609	750	20629	9372	82.5	92.0
1991	14585	7559	3324	673	17909	8232	81.4	91.8
Mean(86–90)	31036	16502	12368	2826	43404	19329	71.8	85.4
95% CL= +/-	17099	8929	6496	1523	22405	10076	10.0	6.5
N	5	5	5	5	5	5	5	5
Mean(81–90)	27459	14793	10642	2384	38101	17177	71.8	85.7
95% CL= +/-	8365	4410	3240	751	10780	4942	6.7	4.2
N	10	10	10	10	10	10	10	10

\* – Is SFA 14 minus AREA O(50).

Table 21. Commercial harvest of small and large Atlantic salmon in Statistical Area M, 1974–1991. Weight in kilograms.

Year	Small		Large		Total		Percent Small	
	Weight	Number	Weight	Number	Weight	Number	Weight	Number
<b>Statistical Area M</b>								
1974	8933	5257	5207	1043	14140	6300	63.2	83.4
1975	10098	5937	6901	1444	16999	7381	59.4	80.4
1976	21568	11986	7285	1620	28853	13606	74.8	88.1
1977	8430	4437	9949	2166	18379	6603	45.9	67.2
1978	12082	6046	5795	1225	17877	7271	67.6	83.2
1979	22061	11038	4179	926	26240	11964	84.1	92.3
1980	13351	6668	7646	1651	20997	8319	63.6	80.2
1981	13290	8300	5866	1227	19156	9527	69.4	87.1
1982	12115	6528	4115	887	16230	7415	74.7	88.0
1983	23551	13100	6804	1515	30355	14615	77.6	89.6
1984	4247	2359	6892	1436	11139	3795	38.1	62.2
1985	8274	4597	2466	514	10740	5111	77.0	89.9
1986	7171	3952	6219	1486	13390	5438	53.6	72.7
1987	24714	12059	11085	2530	35799	14589	69.0	82.7
1988	26700	13807	10509	2390	37209	16197	71.8	85.2
1989	10617	5640	6522	1565	17139	7205	62.0	78.3
1990	9893	4847	1603	330	11496	5177	86.1	93.6
1991	6869	3248	1592	319	8461	3567	81.2	91.1
Mean(86–90)	15819	8061	7188	1660	23007	9721	68.5	82.5
95% CL= +/-	11354	5624	4760	1093	15518	6540	15.0	9.7
N	5	5	5	5	5	5	5	5
Mean(81–90)	14057	7519	6208	1388	20265	8907	67.9	82.9
95% CL= +/-	5714	2935	2171	507	7372	3287	9.8	6.8
N	10	10	10	10	10	10	10	10

Table 22. Commercial harvest of small and large Atlantic salmon in Statistical Area N, 1974–1991. Weight in kilograms.

Year	Small		Large		Total		Percent Small	
	Weight	Number	Weight	Number	Weight	Number	Weight	Number
<b>Statistical Area N</b>								
1974	6141	3840	2118	425	8259	4265	74.4	90.0
1975	6862	4289	4041	843	10903	5132	62.9	83.6
1976	7987	4993	1266	283	9253	5276	86.3	94.6
1977	7045	4404	6563	1431	13608	5835	51.8	75.5
1978	2373	1484	2811	594	5184	2078	45.8	71.4
1979	11919	7449	2154	477	14073	7926	84.7	94.0
1980	14341	6926	5487	1164	19828	8090	72.3	85.6
1981	14019	7370	5669	1179	19688	8549	71.2	86.2
1982	20736	11002	3770	969	24506	11971	84.6	91.9
1983	4600	2426	1897	450	6497	2876	70.8	84.4
1984	5472	2880	2916	648	8388	3528	65.2	81.6
1985	7815	4113	1339	298	9154	4411	85.4	93.2
1986	15235	8489	7572	1858	22807	10347	66.8	82.0
1987	21496	12106	4173	956	25669	13062	83.7	92.7
1988	13996	7907	3463	692	17459	8599	80.2	92.0
1989	10538	5823	3824	863	14362	6686	73.4	87.1
1990	6231	3321	1559	332	7790	3653	80.0	90.9
1991	6741	3812	1016	191	7757	4003	86.9	95.2
Mean(86–90)	13499	7529	4118	940	17617	8469	76.8	88.9
95% CL= +/-	7046	4054	2706	702	8757	4434	8.4	5.5
N	5	5	5	5	5	5	5	5
Mean(81–90)	12014	6544	3618	825	15632	7368	76.1	88.2
95% CL= +/-	4367	2436	1372	332	5288	2648	5.4	3.2
N	10	10	10	10	10	10	10	10

Table 23. Commercial harvest of small and large Atlantic salmon in Statistical Area A(01), 1974–1991. Weight in kilograms.

Year	Small		Large		Total		Percent Small	
	Weight	Number	Weight	Number	Weight	Number	Weight	Number
<b>Statistical Area A(01)</b>								
1974	753	379	333	71	1086	450	69.3	84.2
1975	1616	808	810	184	2426	992	66.6	81.5
1976	889	463	757	184	1646	647	54.0	71.6
1977	869	436	1055	226	1924	662	45.2	65.9
1978	2699	1347	990	212	3689	1559	73.2	86.4
1979	2230	1110	839	199	3069	1309	72.7	84.8
1980	594	280	1042	216	1636	496	36.3	56.5
1981	654	340	1631	331	2285	671	28.6	50.7
1982	860	451	378	78	1238	529	69.5	85.3
1983	1059	587	720	156	1779	743	59.5	79.0
1984	1589	795	66	14	1655	809	96.0	98.3
1985	1130	565	50	11	1180	576	95.8	98.1
1986	1195	804	1120	285	2315	1089	51.6	73.8
1987	2122	1076	1206	227	3328	1303	63.8	82.6
1988	2394	1227	1365	254	3759	1481	63.7	82.9
1989	1981	1000	1174	275	3155	1275	62.8	78.4
1990	896	454	447	88	1343	542	66.7	83.8
1991	975	499	716	163	1691	662	57.7	75.4
Mean(86–90)	1718	912	1062	226	2780	1138	61.7	80.3
95% CL= +/-	795	370	442	100	1191	448	7.3	5.2
N	5	5	5	5	5	5	5	5
Mean(81–90)	1388	730	816	172	2204	902	65.8	81.3
95% CL= +/-	428	214	401	84	666	254	14.0	9.6
N	10	10	10	10	10	10	10	10



Table 24. Total recreational harvest (estimated + observed) of Atlantic salmon in Gulf Region, Salmon Fishing Area 14(a)\*, 1976–1991.

Year	Effort Rod Days	Small <63 cm	Large >63 cm	Total	Catch/ Effort	Percent Small
<b>Salmon Fishing Area 14(a)*</b>						
1976	17146	7381	100	7481	0.44	.
1977	17067	5707	472	6179	0.36	94.0
1978	12069	3241	72	3313	0.27	98.8
1979	14285	6578	59	6637	0.46	98.2
1980	14219	3743	180	3923	0.28	97.3
1981	18718	5882	137	6019	0.32	96.5
1982	16113	4763	107	4870	0.30	98.2
1983	16020	3800	69	3869	0.24	98.6
1984	16497	4807	87	4894	0.30	97.8
1985	13407	3678	29	3707	0.28	99.4
1986	15465	5047	102	5149	0.33	97.3
1987	15061	4620	41	4661	0.31	99.2
1988	18968	6251	171	6422	0.34	96.4
1989	16223	3203	44	3247	0.20	99.3
1990	16413	5050	136	5186	0.32	95.9
1991	13850	3565	117	3682	0.27	97.7
Mean(86–90)	16426	4834	99	4933	0.30	97.6
95% CL= +/-	1892	1361	71	1421	0.07	1.9
N	5	5	5	5	5	5
Mean(81–90)	16289	4710	92	4802	0.29	97.9
95% CL= +/-	1162	681	34	711	0.03	0.9
N	10	10	10	10	10	10
Mean(76–90)	15845	4917	120	5037	0.32	91.1
95% CL= +/-	1028	698	59	717	0.04	1.3
N	15	15	15	15	15	15

Numbers of MSW salmon from 1985–91 refer to hooked and released fish.

Percent 1SW is calculated by year of smolt migration.

\* Is SFA 14 minus AREA O(50).

Table 25. Total recreational harvest (estimated + observed) of Atlantic salmon in Gulf Region, Statistical Area M, 1976–1991.

Year	Effort Rod Days	Small <63 cm	Large >63 cm	Total	Catch/ Effort	Percent Small
<b>Statistical Area M</b>						
1976	12781	4275	66	4341	0.34	.
1977	12350	3151	454	3605	0.29	90.4
1978	8718	1800	59	1859	0.21	98.2
1979	9805	3171	46	3217	0.33	97.5
1980	10202	2016	148	2164	0.21	95.5
1981	13767	3224	98	3322	0.24	95.4
1982	11267	2554	53	2607	0.23	98.4
1983	10832	1721	51	1772	0.16	98.0
1984	11483	2996	84	3080	0.27	95.3
1985	9423	2213	26	2239	0.24	99.1
1986	11022	3263	98	3361	0.30	95.8
1987	10571	2887	35	2922	0.28	98.9
1988	12811	3945	168	4113	0.32	94.5
1989	11623	2241	43	2284	0.20	98.9
1990	12037	3929	135	4064	0.34	94.3
1991	9857	2975	117	3092	0.31	97.1
Mean(86–90)	11613	3253	96	3349	0.29	96.8
95% CL= +/-	873	898	71	964	0.05	1.0
N	5	5	5	5	5	5
Mean(81–90)	11484	2897	79	2976	0.26	97.2
95% CL= +/-	1205	523	33	552	0.03	0.6
N	10	10	10	10	10	10
Mean(76–90)	11246	2892	104	2997	0.27	96.3
95% CL= +/-	1383	440	59	458	0.03	1.8
N	15	15	15	15	15	15

Numbers of MSW salmon from 1985–91 refer to hooked and released fish.  
Percent 1SW is calculated by year of smolt migration.

Table 26. Total recreational harvest (estimated + observed) of Atlantic salmon in Gulf Region, Statistical Area N, 1976–1991.

Year	Effort Rod Days	Small <63 cm	Large >63 cm	Total	Catch/ Effort	Percent Small
<b>Statistical Area N</b>						
1976	3533	3014	34	3048	0.86	.
1977	3376	2413	18	2431	0.72	99.4
1978	2687	1350	13	1363	0.51	99.5
1979	3818	3281	13	3294	0.86	99.0
1980	3380	1651	32	1683	0.50	99.0
1981	4324	2511	31	2542	0.59	98.2
1982	4324	2156	54	2210	0.51	97.9
1983	4320	1947	16	1963	0.45	99.3
1984	4633	1753	3	1756	0.38	99.8
1985	3463	1377	3	1380	0.40	99.8
1986	3938	1648	4	1652	0.42	99.7
1987	3839	1656	6	1662	0.43	99.6
1988	5214	2148	3	2151	0.41	99.8
1989	3176	886	1	887	0.28	100.0
1990	3333	1032	1	1033	0.31	99.9
1991	2602	555	0	555	0.21	100.0
Mean(86–90)	3900	1474	3	1477	0.38	99.8
95% CL= +/-	803	639	3	640	0.06	0.1
N	5	5	5	5	5	5
Mean(81–90)	4056	1711	12	1724	0.42	99.3
95% CL= +/-	632	365	12	373	0.05	0.6
N	10	10	10	10	10	10
Mean(76–90)	3824	1922	15	1937	0.51	99.3
95% CL= +/-	650	377	9	381	0.09	0.4
N	15	15	15	15	15	15

Numbers of MSW salmon from 1985–91 refer to hooked and released fish.  
Percent 1SW is calculated by year of smolt migration.

Table 27. Total recreational harvest (estimated + observed) of Atlantic salmon in Gulf Region, Statistical Area A(01), 1976–1991.

Year	Effort Rod Days	Small <63 cm	Large >63 cm	Total	Catch/ Effort	Percent Small
<b>Statistical Area A(01)</b>						
1976	832	92	0	92	0.11	.
1977	1341	143	0	143	0.11	100.0
1978	664	91	0	91	0.14	100.0
1979	662	126	0	126	0.19	100.0
1980	637	76	0	76	0.12	100.0
1981	627	147	8	155	0.25	90.5
1982	522	53	0	53	0.10	100.0
1983	868	132	2	134	0.15	96.4
1984	381	58	0	58	0.15	100.0
1985	521	88	0	88	0.17	100.0
1986	505	136	0	136	0.27	100.0
1987	651	77	0	77	0.12	100.0
1988	943	158	0	158	0.17	100.0
1989	1424	76	0	76	0.05	100.0
1990	1043	89	0	89	0.09	100.0
1991	1391	35	0	35	0.03	100.0
Mean(86–90)	913	107	0	107	0.12	100.0
95% CL= +/-	358	47	0	47	0.06	0.0
N	5	5	5	5	5	5
Mean(81–90)	749	101	1	102	0.14	99.0
95% CL= +/-	319	27	2	28	0.05	1.4
N	10	10	10	10	10	10
Mean(76–90)	775	103	1	103	0.13	99.3
95% CL= +/-	304	19	1	19	0.03	1.0
N	15	15	15	15	15	15

Numbers of MSW salmon from 1985–91 refer to hooked and released fish.  
Percent 1SW is calculated by year of smolt migration.

Table 28. Commercial harvest of small and large Atlantic salmon in Statistical Area O(50), 1974–1991. Weight in kilograms.

Year	Small		Large		Total		Percent Small	
	Weight	Number	Weight	Number	Weight	Number	Weight	Number
<b>Statistical Area O(50) *</b>								
1974	18655	9328	77743	15863	96398	25191	19.4	37.0
1975	36670	19294	63414	14752	100084	34046	36.6	56.7
1976	27635	13152	68416	15189	96051	28341	28.8	46.4
1977	22521	11267	91433	18664	113954	29931	19.8	37.6
1978	7649	4026	55071	11715	62720	15741	12.2	25.6
1979	15096	7194	17032	3874	32128	11068	47.0	65.0
1980	18877	8493	46168	9138	65045	17631	29.0	48.2
1981	13681	6658	38485	7606	52166	14264	26.2	46.7
1982	14535	7379	27195	5966	41730	13345	34.8	55.3
1983	6580	3292	33265	7489	39845	10781	16.5	30.5
1984	4841	2421	29844	6218	34685	8639	14.0	28.0
1985	11099	7460	15916	3954	27015	11414	41.1	65.4
1986	14602	8296	26203	5342	40805	13638	35.8	60.8
1987	22987	11389	58170	11114	81157	22503	28.3	50.6
1988	15155	7087	22615	4591	37770	11678	40.1	60.7
1989	19291	9053	22036	4646	41327	13699	46.7	66.1
1990	7735	3592	15335	2858	23070	6450	33.5	55.7
1991	11391	5303	22616	4417	34007	9720	33.5	54.6
Mean(86–90)	15954	7883	28872	5710	44826	13594	36.9	58.8
95% CL= +/-	7095	3560	20912	3919	26857	7189	8.6	7.3
N	5	5	5	5	5	5	5	5
Mean(81–90)	13051	6663	28906	5978	41957	12641	31.7	52.0
95% CL= +/-	4050	2007	8979	1674	11430	3042	7.5	9.6
N	10	10	10	10	10	10	10	10

\* Also referred to as SFA 14(b)

Table 29. Total recreational harvest (estimated + observed) of Atlantic salmon in Gulf Region, Statistical Area O(50)\*, 1976–1991.

Year	Effort Rod Days	Small <63 cm	Large >63 cm	Total	Catch/ Effort	Percent Small
<b>Statistical Area O(50)*</b>						
1976	3896	2498	310	2808	0.72	.
1977	3918	1662	593	2255	0.58	80.8
1978	2413	573	183	756	0.31	90.1
1979	2149	901	119	1020	0.47	82.8
1980	2476	938	337	1275	0.51	72.8
1981	3353	1698	220	1918	0.57	81.0
1982	3279	1271	80	1351	0.41	95.5
1983	3529	2000	130	2130	0.60	90.7
1984	3997	987	185	1172	0.29	91.5
1985	3664	1092	100	1192	0.33	90.8
1986	4643	1071	184	1255	0.27	85.6
1987	4993	1887	215	2102	0.42	83.3
1988	5707	1592	251	1843	0.32	88.3
1989	4895	1173	53	1226	0.25	96.8
1990	5075	1066	98	1164	0.23	92.3
1991	4017	1152	49	1201	0.30	95.6
Mean(86–90)	5063	1358	160	1518	0.30	89.5
95% CL= +/-	395	455	102	529	0.07	3.2
N	5	5	5	5	5	5
Mean(81–90)	4314	1384	152	1535	0.36	90.0
95% CL= +/-	854	269	49	293	0.07	2.3
N	10	10	10	10	10	10
Mean(76–90)	3866	1361	204	1564	0.40	87.6
95% CL= +/-	1054	284	75	317	0.08	4.0
N	15	15	15	15	15	15

Percent 1SW is calculated by year of smolt migration.

\* Also referred to as SFA 14(b).

Table 30. Counts of Atlantic salmon at Torrent River Fishway and angling catch below the fishway, 1971–1991.

YEAR	TORRENT RIVER FISHWAY COUNTS			ANGLING BELOW FISHWAY		
	SMALL < 63cm	LARGE > 63 cm	TOTAL	SMALL < 63cm	LARGE > 63 cm	TOTAL
1971	54	4	58	53	5	58
1972	64	3	67	22	3	25
1973	96	12	108	88	3	91
1974	38	3	41	58	4	62
1975	191	25	216	123	6	129
1976	341	47	388	.	.	.
1977	789	33	822	.	.	.
1978	971	21	992	31	4	35
1979	1,984	39	2,023	65	3	68
1980	792	63	855	.	.	.
1981	2,101	97	2,198	167	18	185
1982	2,112	523	2,635	187	2	189
1983	2,007	442	2,449	82	1	83
1984	1,805	288	2,093	.	.	.
1985	1,553	30	1,583	70	0	70
1986	2,815	92	2,907	340	5	345
1987	2,505	68	2,573	165	0	165
1988	2,075	44	2,119	313	0	313
1989	1,369	60	1,429	143	0	143
1990	2,296	82	2,378	222	4	226
1991	1,415	73	1,488	150	1	151
Mean(86–90)	2,212	69	2,281	237	2	238
95% CL= +/-	605	21	618	97	3	99
N	5	5	5	5	5	5
Mean(81–90)	2,064	173	2,236	169	3	172
95% CL= +/-	289	122	312	71	4	72
N	10	10	10	10	10	10

For 1991, the number of small and large salmon in July was determined from the total count multiplied by percentages of small and large salmon counted during July in 1985–1990.

Table 31. Western Arm Brook counting fence counts of Atlantic salmon 1971–1991. Upstream counts in parentheses refer to salmon after broodstock removal. Angling catches in parentheses refer to hooked and released catches.

YEAR	DOWNSTREAM COUNTS		UPSTREAM COUNTS		ANGLING BELOW FENCE		TOTAL ADULT RETURNS
	SMOLT	KELT	SMALL	LARGE	SMALL	LARGE	
			< 63 cm	> 63 cm	< 63 cm	> 63 cm	
1971	5,735	185	427	–	205	0	632
1972	11,905	211	309 (205)	9	97	0	415
1973	8,484	95	555 (351)	30	243	0	828
1974	11,854	302	399 (299)	4	124	0	527
1975	9,600	203	631 (393)	1	8	0	640
1976	6,232	201	520 (420)	0	32	0	552
1977	9,899	327	341	3	11	0	355
1978	13,071	210	285	1	22	1	309
1979	8,349	1	1,578	0	.	.	1,578
1980	15,665	899	430	3	30	2	465
1981	13,981	168	447	1	41	0	489
1982	12,477	300	387	3	73	0	463
1983	10,552	207	1,141	4	.	.	1,145
1984	20,653	719	120	0	115	0	235
1985	13,417	111	168	2	98 (53)	(1)	223
1986	17,719	170	252	0	(17)	0	252
1987	17,029	73	378	1	59	(2)	438
1988	15,321	355	251	1	171	0	423
1989	11,407	251	455	0	.	.	455
1990	10,563	146	322	0	.	.	322
1991	13,453	155	233	1	.	.	234
Mean(86–90)	14,408	199	332	0	46	0	378
95% CL= +/-	3,618	120	97	1	83	0	97
N	5	5	5	5	5	5	5
Mean(81–90)	14,312	250	392	1	46	0	445
95% CL= +/-	2,275	126	194	1	40	0	181
N	10	10	10	10	10	10	10

1. 1985–1991, hook and release angling of large salmon.
2. 1985–1986, angling catches collected by MAFD personnel.
3. 1985 and 1988 upstream counts determined from kelt counts in 1986 and 1989.
4. 1989 upstream count based on recapture ratio of 1:0.1 marked to unmarked kelts in 1990.
5. 1990 upstream count based on recapture ratio of 1:2.6 marked to unmarked kelts in 1991.



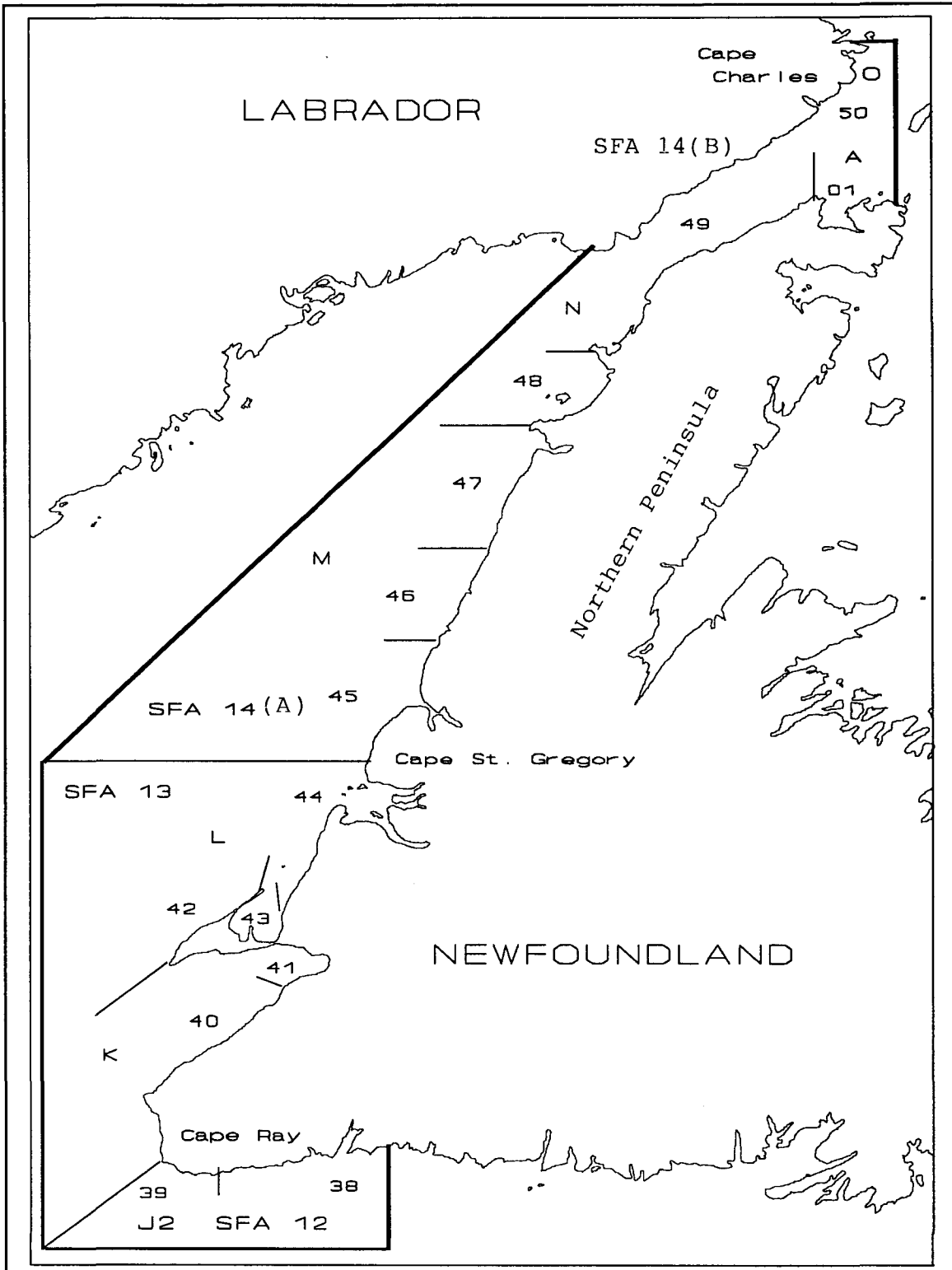


Figure 1. Boundaries of Salmon Fishing Areas (SFA), Statistical Areas (Capital Letters), Statistical Sections (Numbers), for Western Newfoundland and Southern Labrador, Gulf Region.

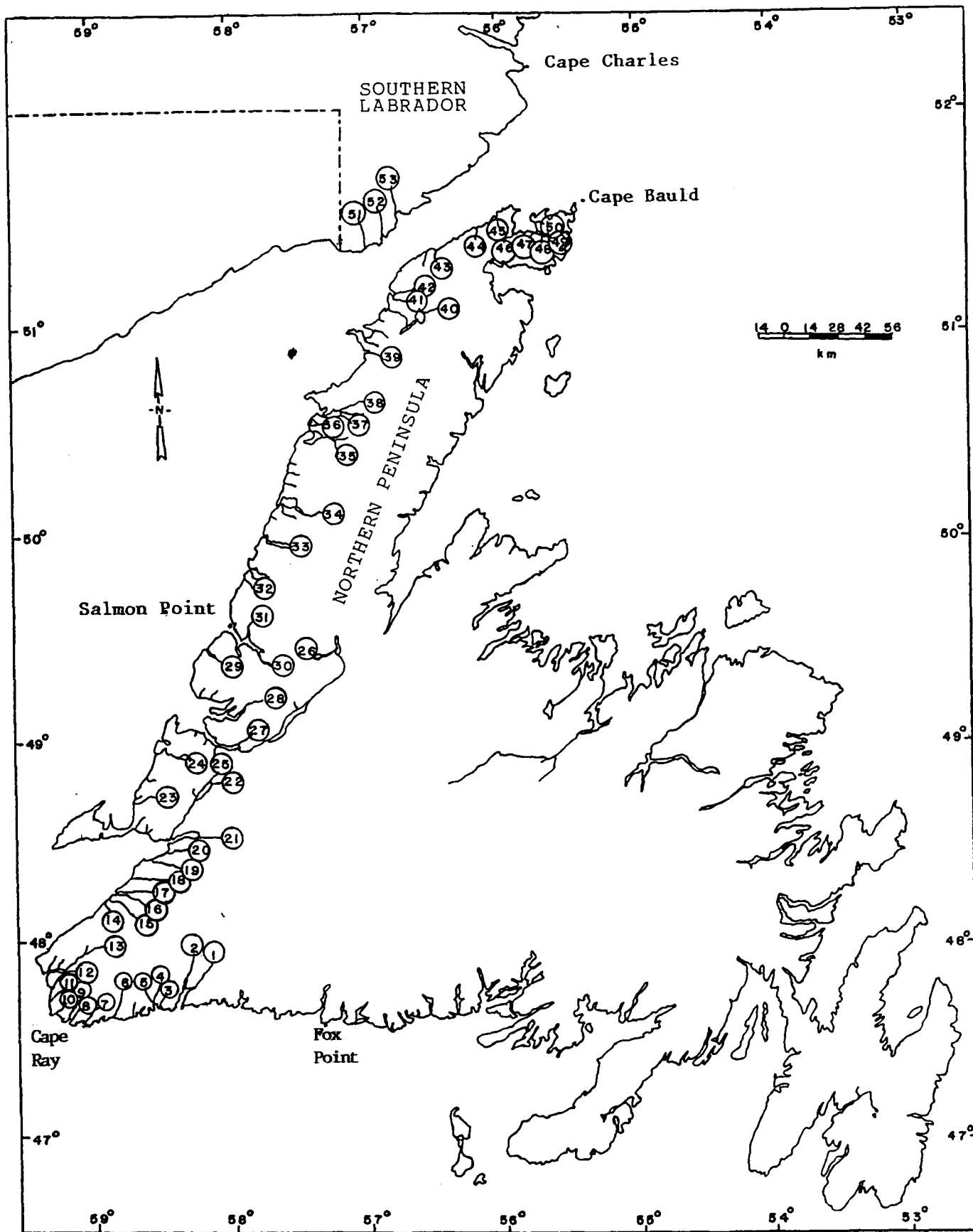


Fig. 2 Location of salmon rivers in Western Newfoundland and Labrador. Refer to Table 2 for map index.

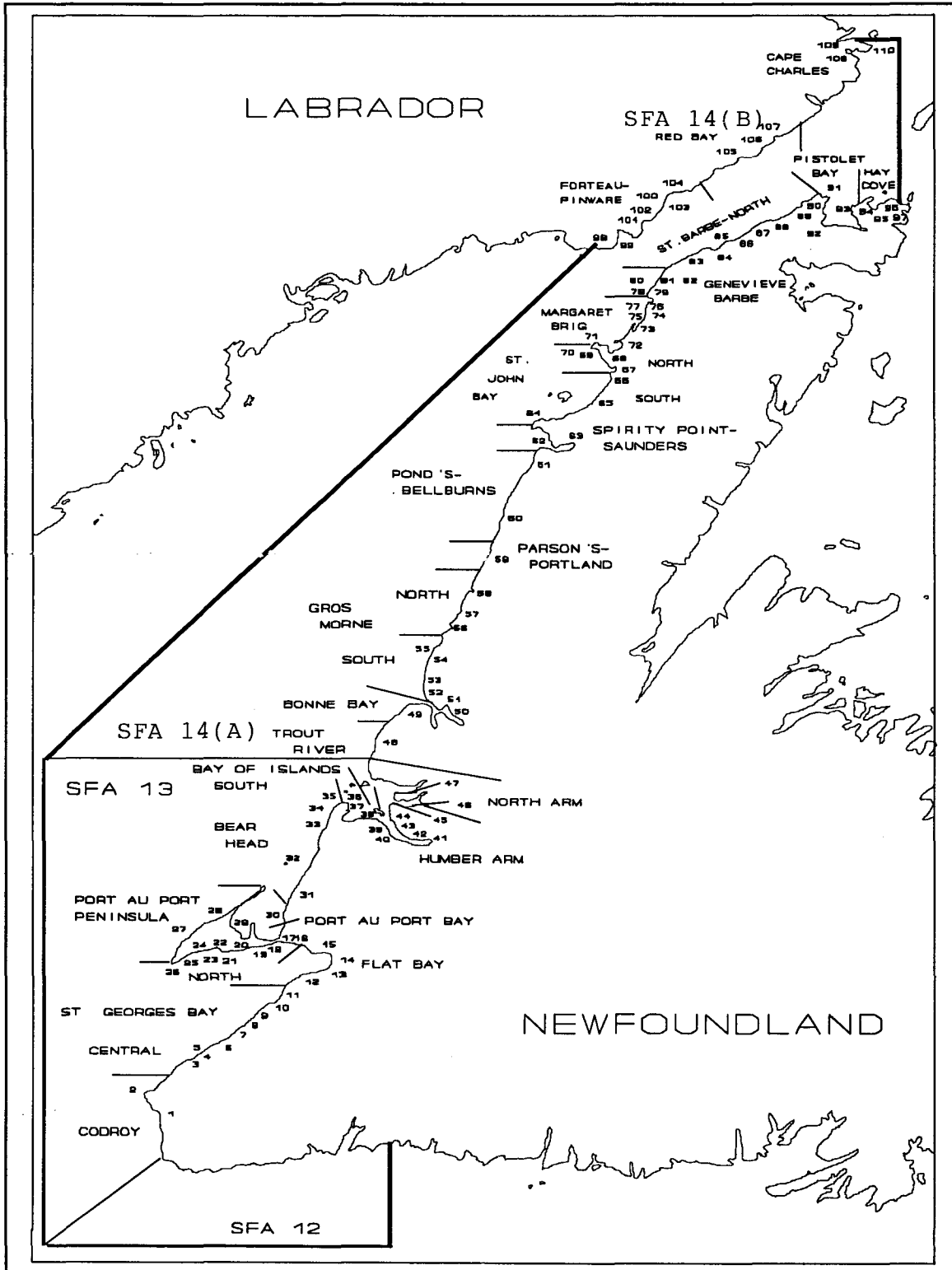


Figure 3. Location of Coastal Areas in Western Newfoundland and Southern Labrador, Gulf Region. Numbers refer to community codes given in Jones and Mullins 1992.

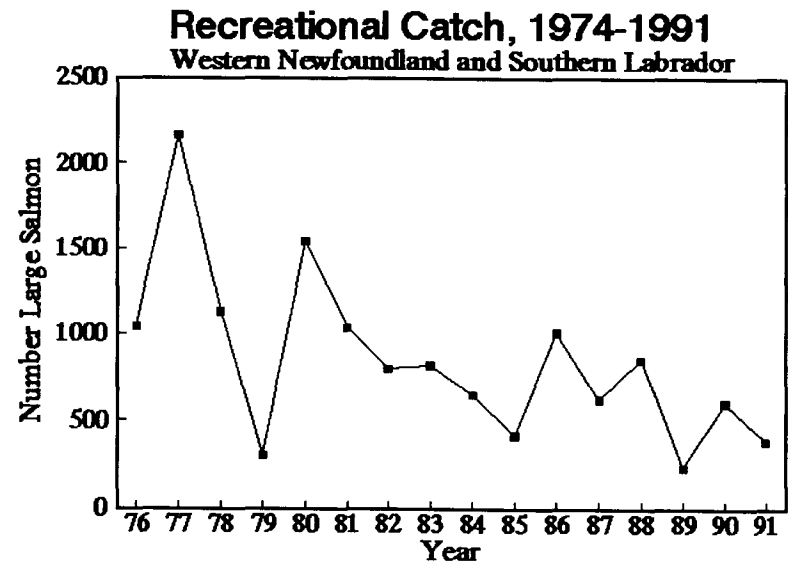
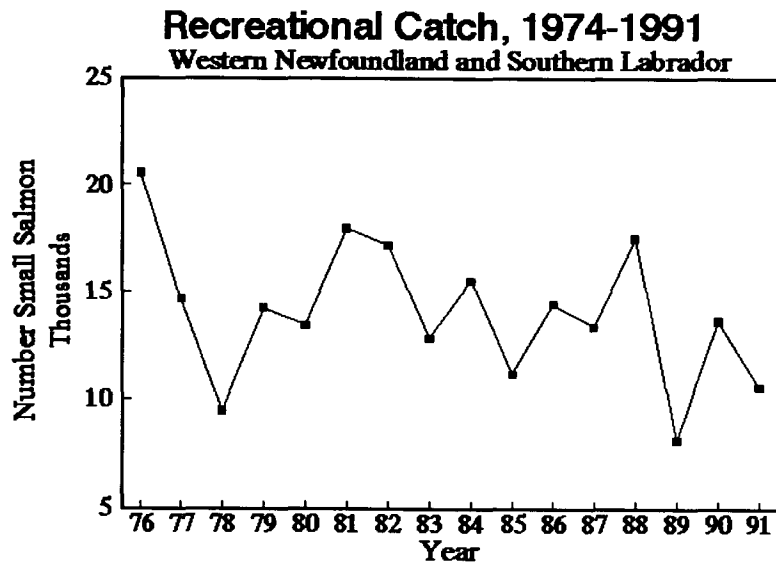
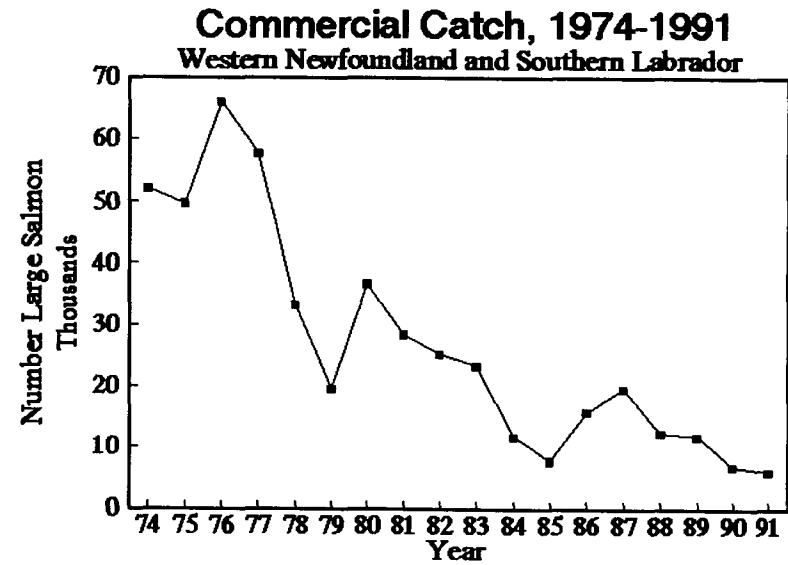
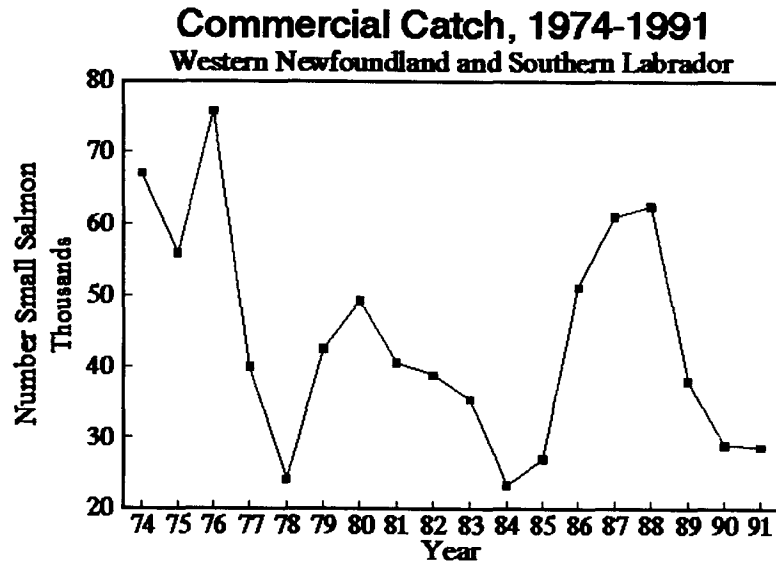


Figure 4. Commercial and recreational harvests of small and large Atlantic salmon in Western Newfoundland and Southern Labrador, Gulf Region, 1974-1991. Area J2 fishery closed in 1984-1991, hence, those years are not directly comparable with earlier years.

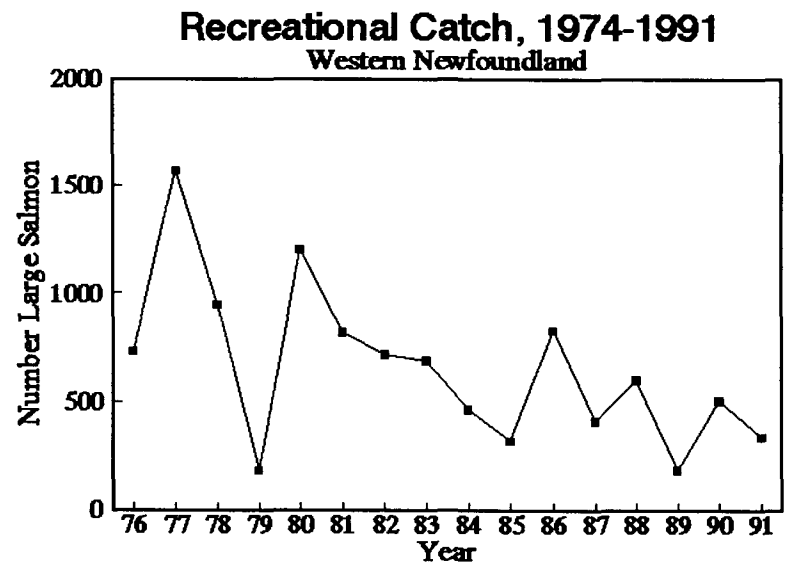
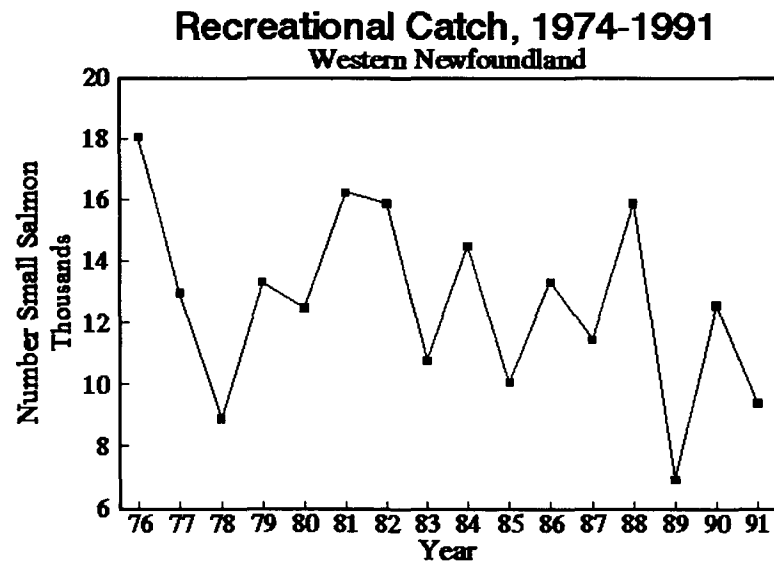
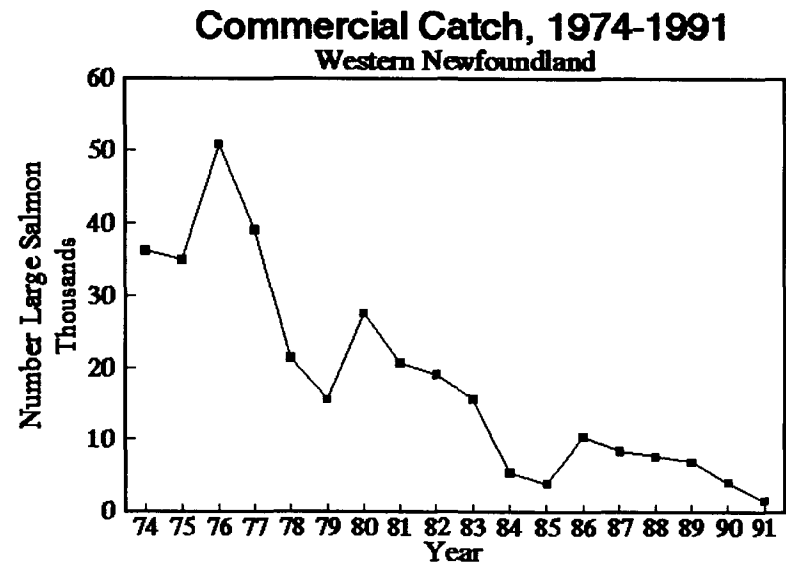
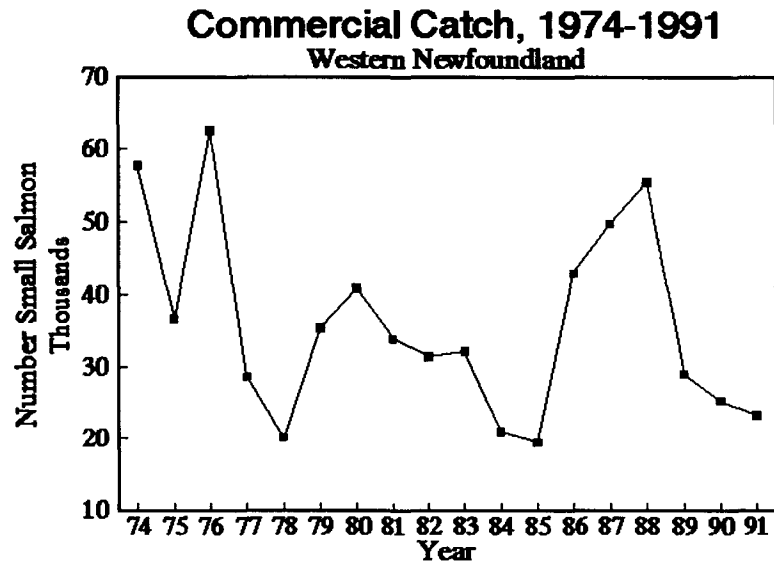


Figure 5. Commercial and recreational harvests of small and large Atlantic salmon in the Insular Newfoundland portion of the Gulf Region, 1974-1991. Area J2 fishery closed 1984-1991, hence, those years not directly comparable with earlier years.

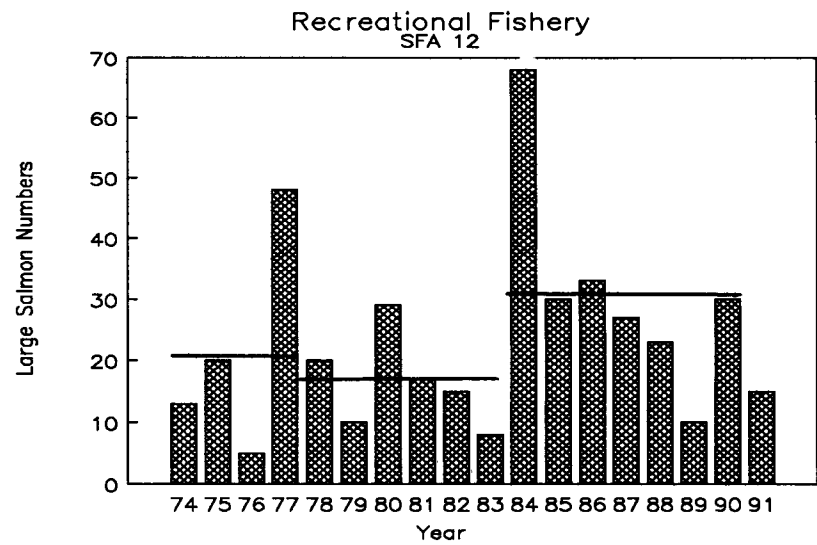
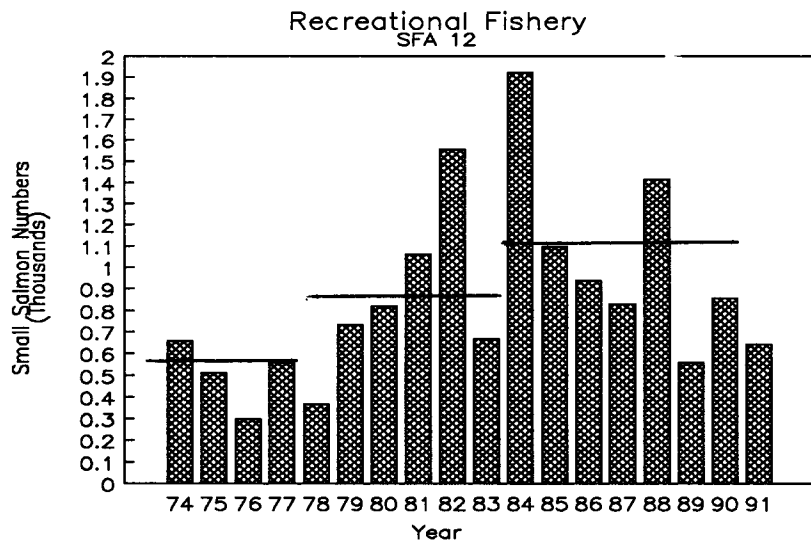
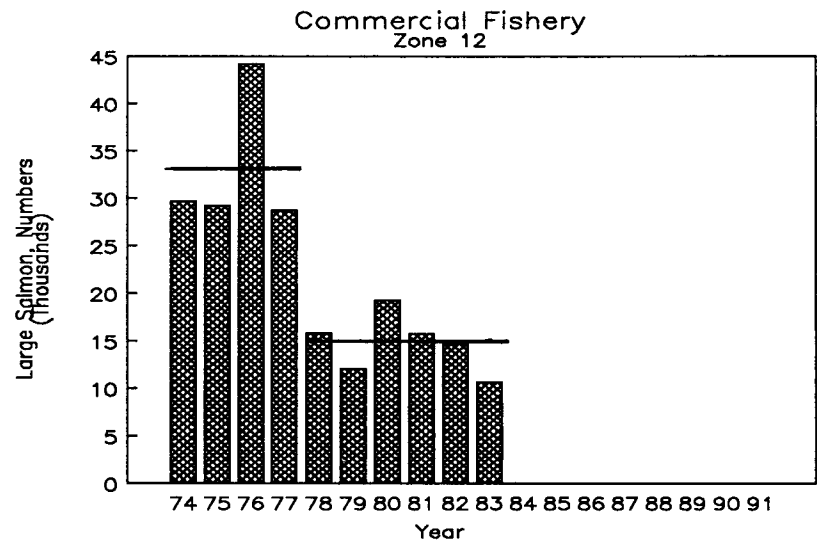
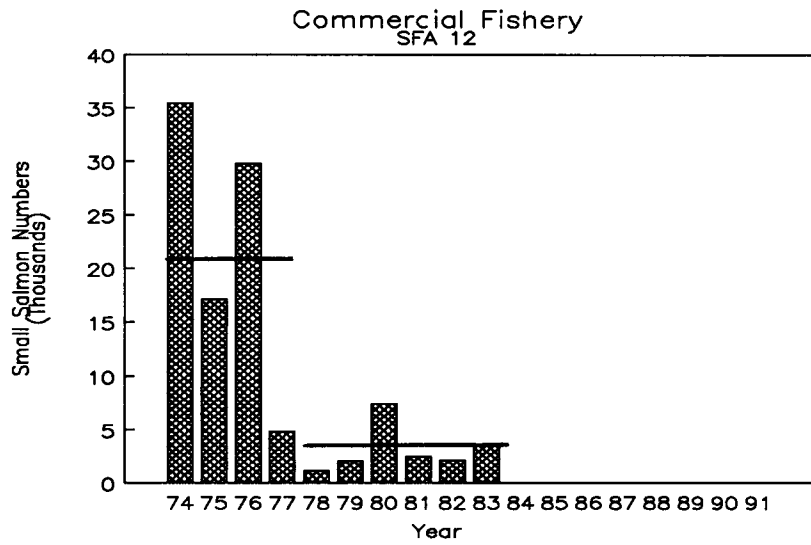


Fig. 6. Atlantic salmon commercial and recreational harvests for SFA 12, 1991. Mean harvests for years with similar management plans are shown by horizontal bars.

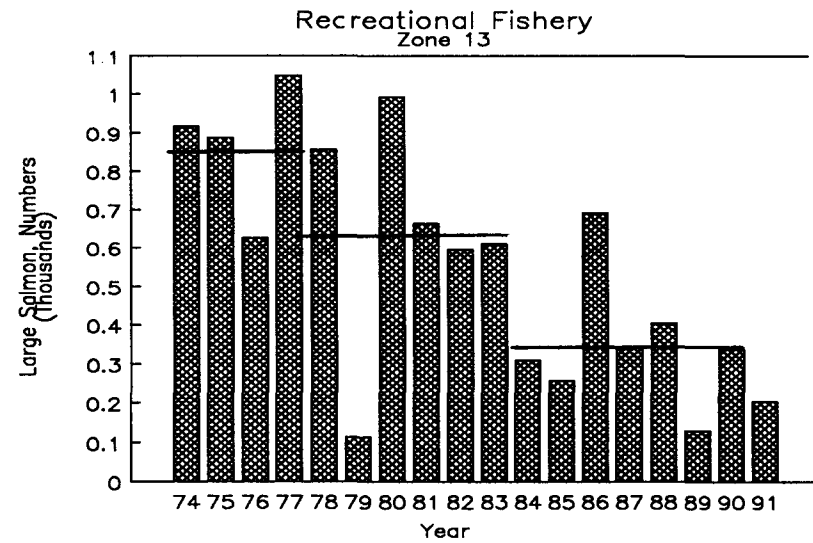
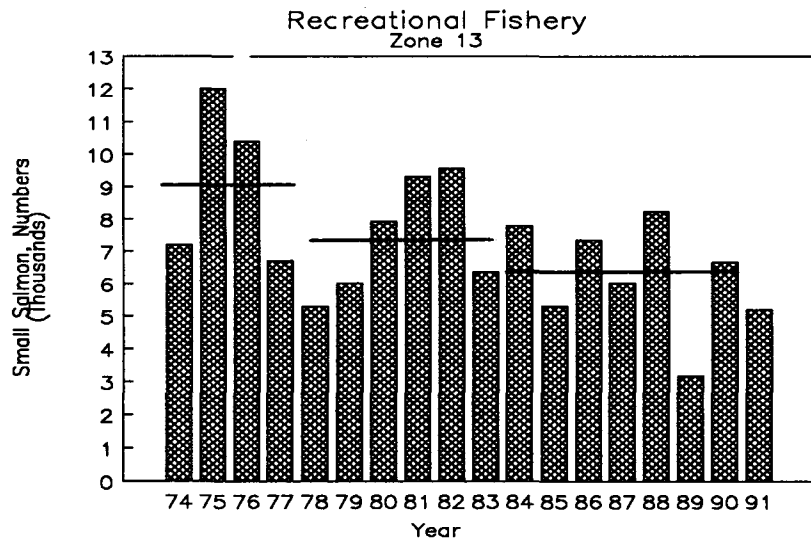
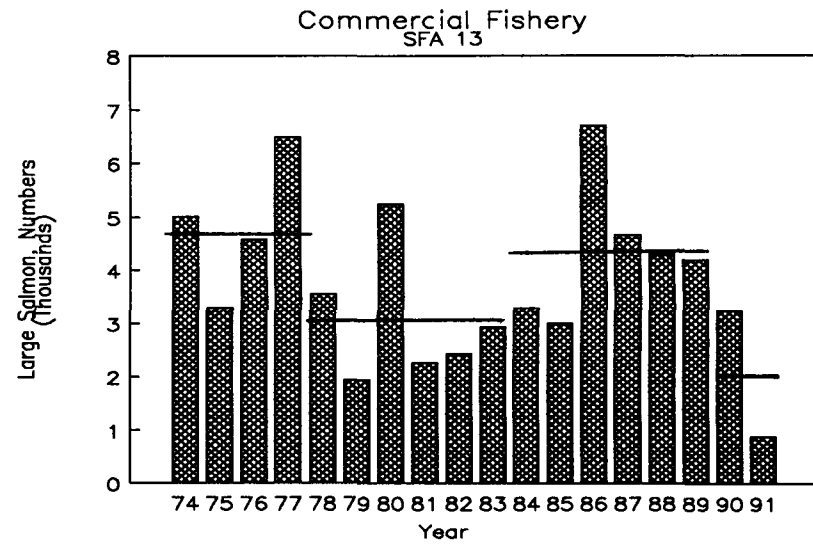
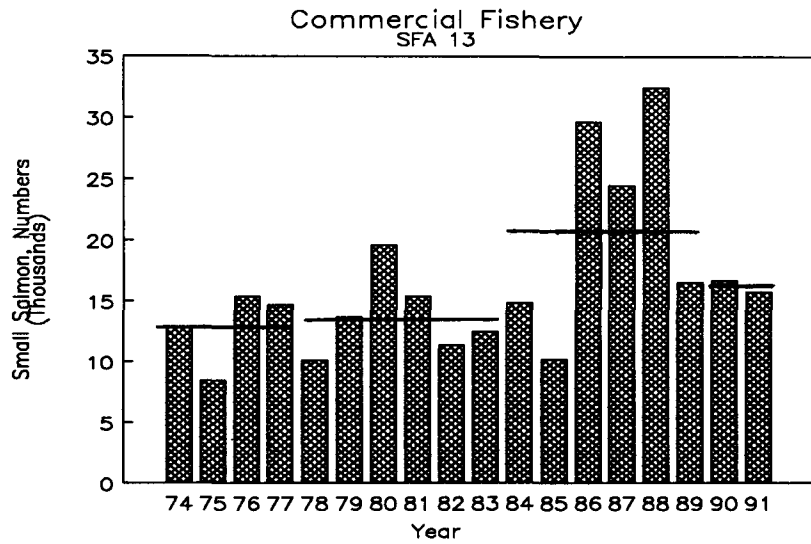


Fig. 7. Atlantic salmon commercial and recreational harvests for SFA 13, 1991. Mean harvests for years with similar management plans are shown by horizontal bars.

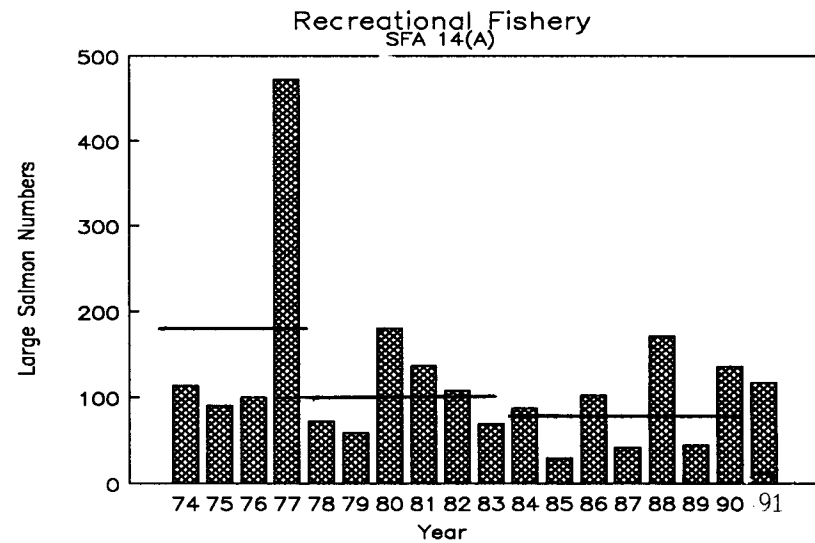
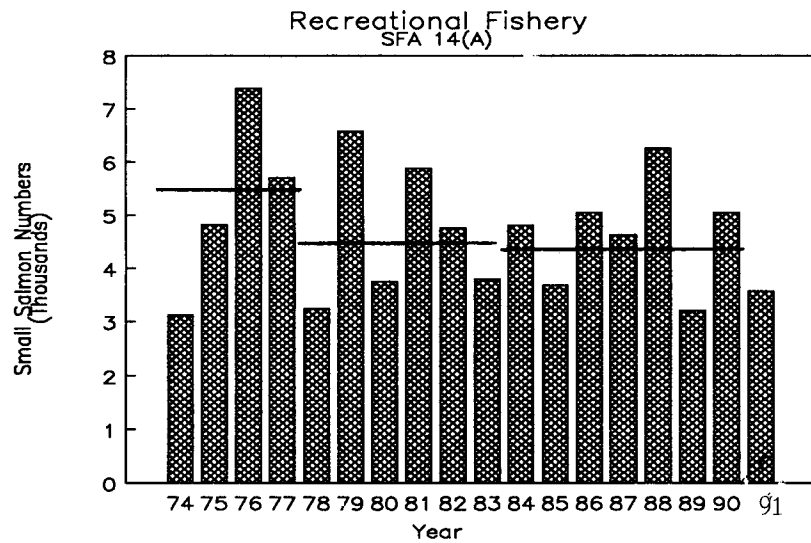
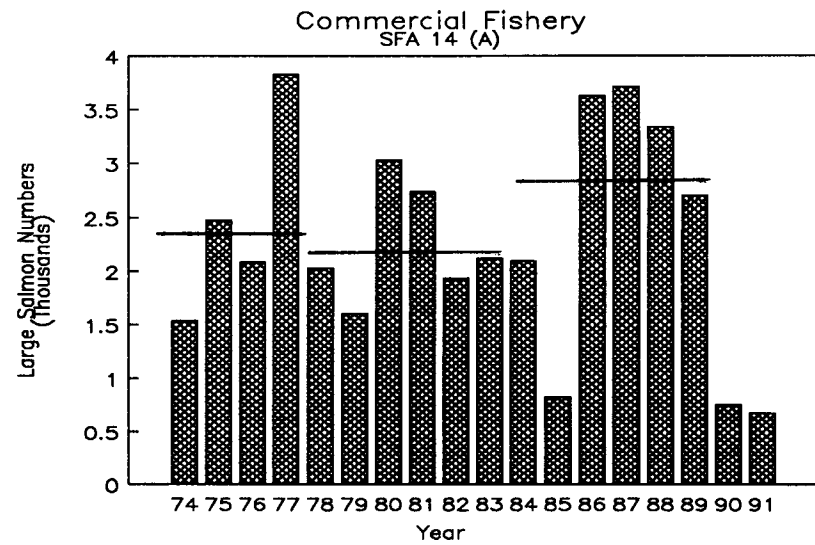
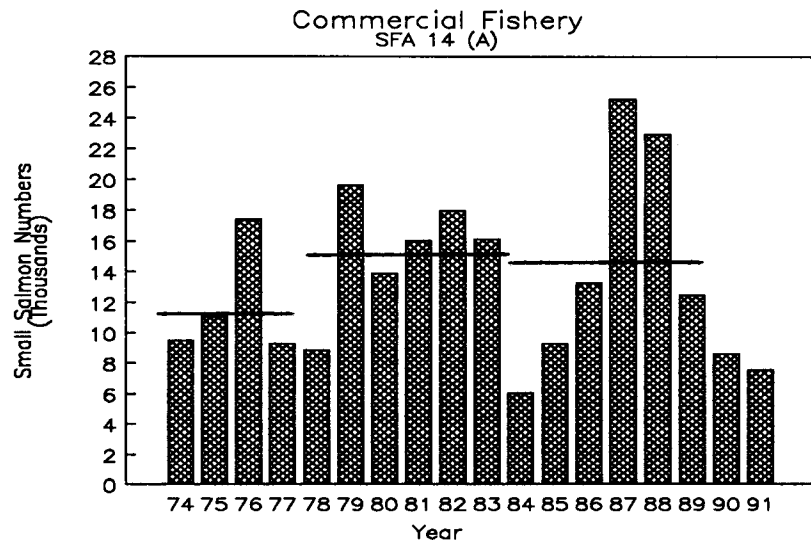


Fig. 8. Atlantic salmon commercial and recreational harvests for the Northern Peninsula, SFA 14(a), 1991. Mean harvests for years with similar management plans are shown by horizontal bars.



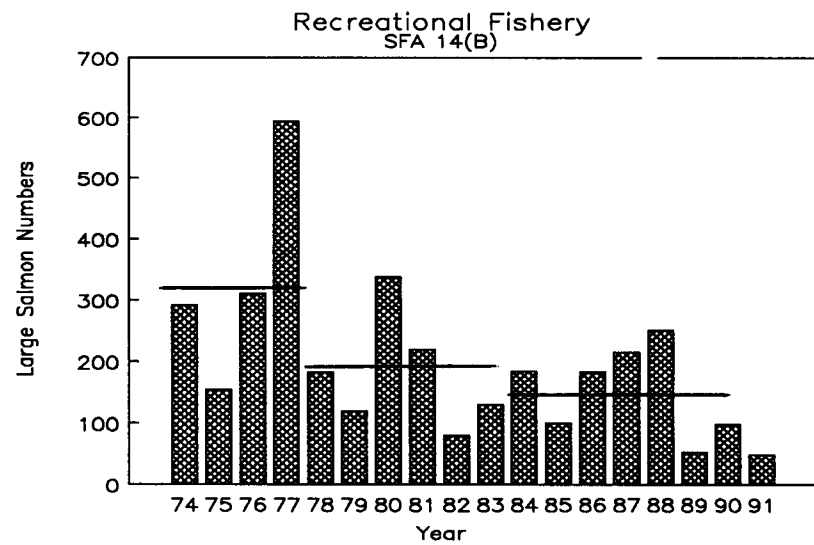
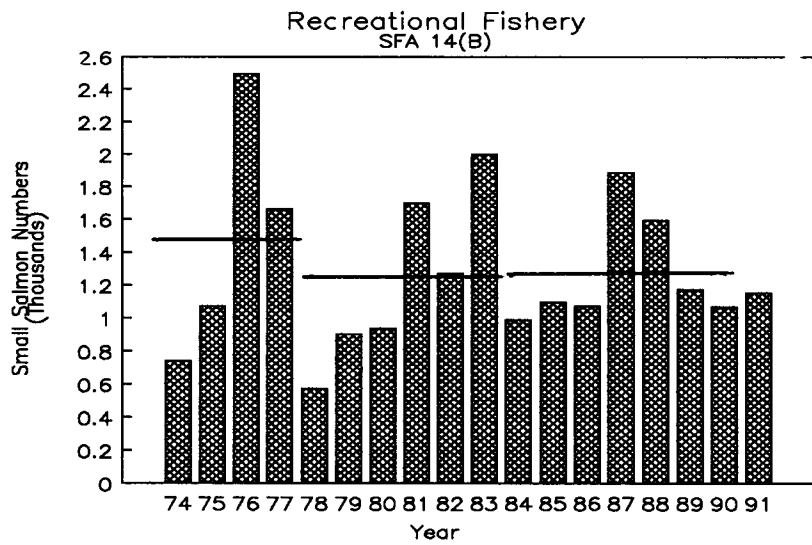
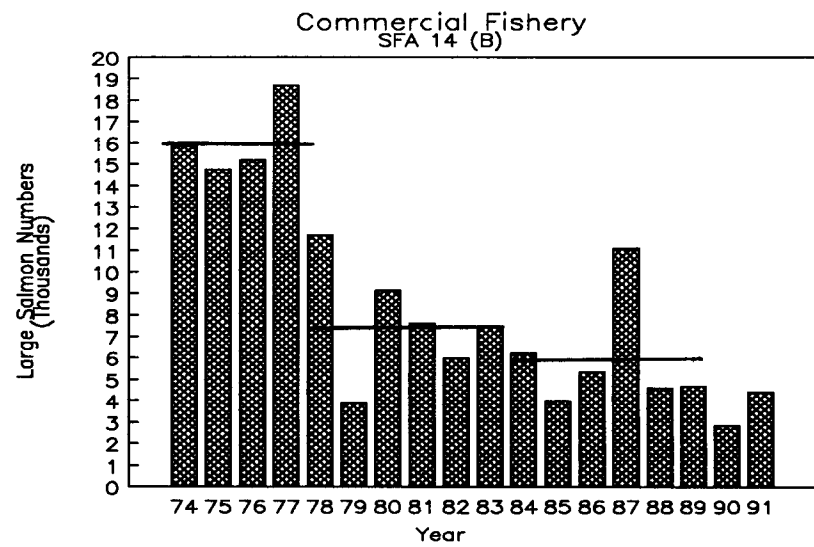
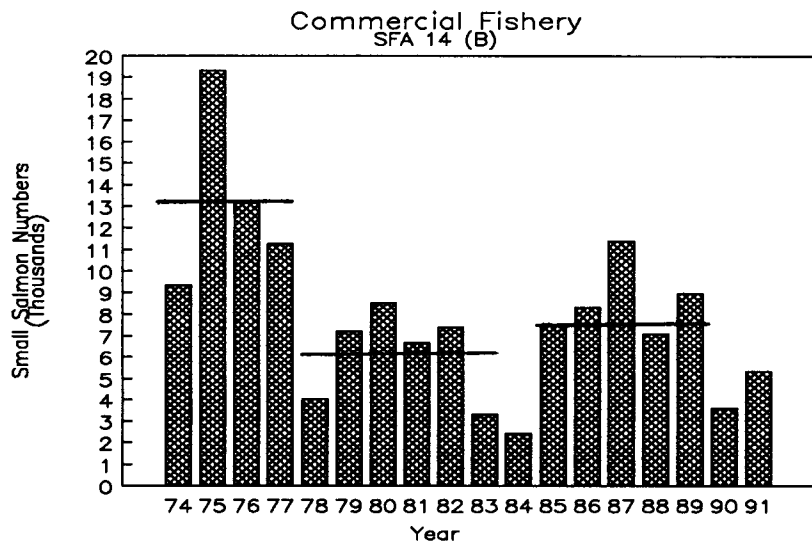


Fig. 9. Atlantic salmon commercial and recreational harvests for Southern Labrador, Section 50, SFA 14(b), 1991. Means for years with similar management plans are shown by horizontal bars.

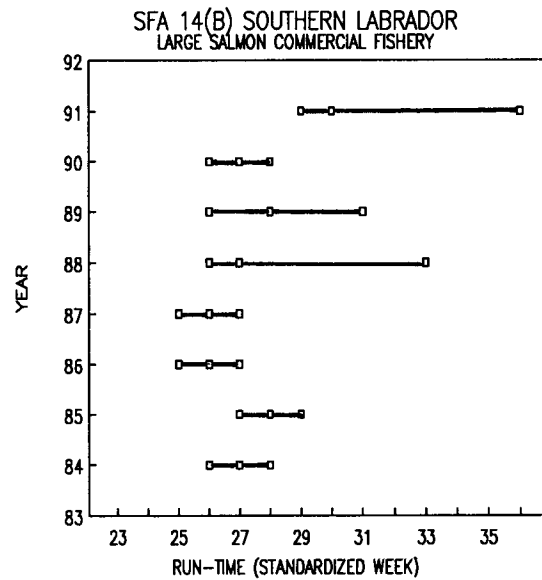
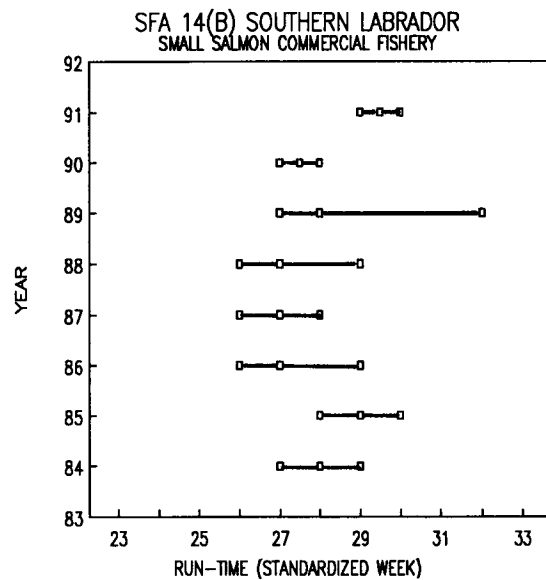
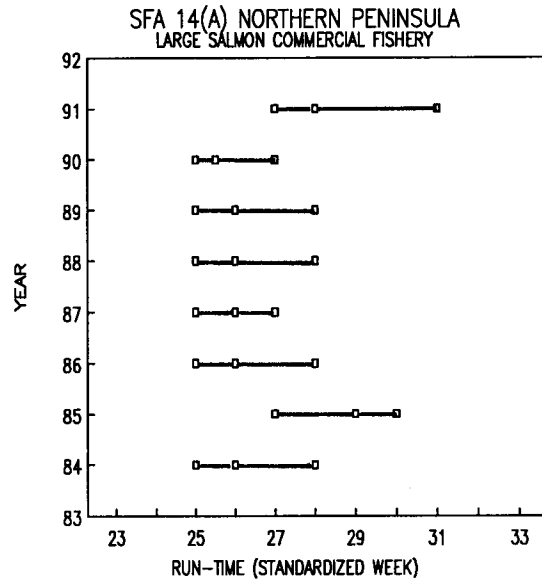
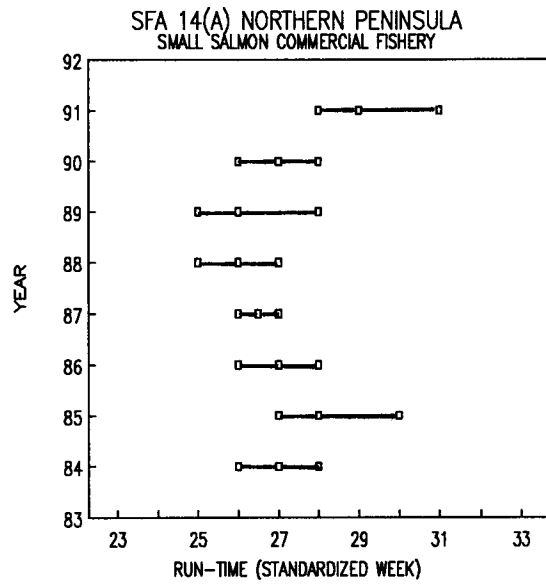
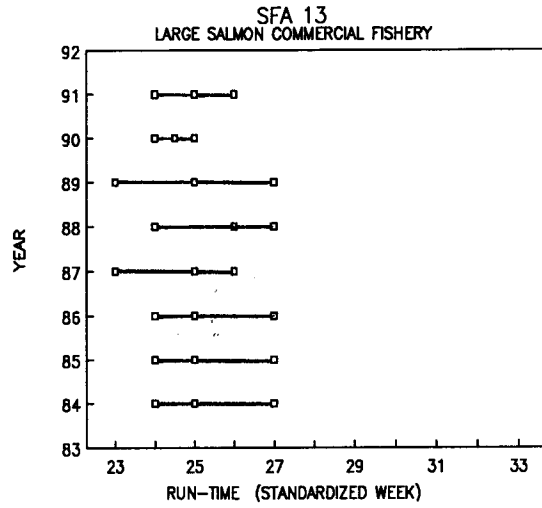
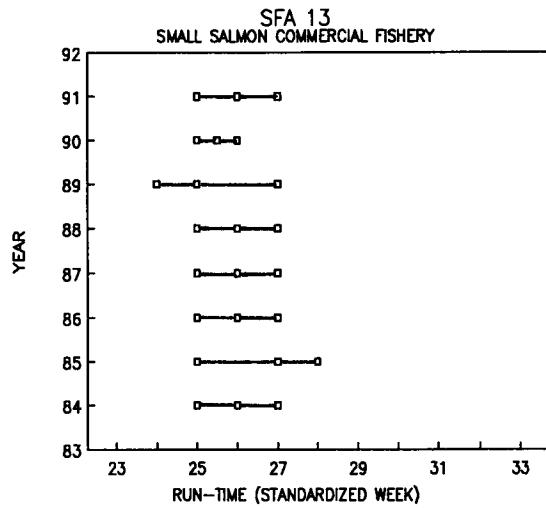


Fig. 10. Timing of commercial fisheries harvests in standardized weeks, 1984-91. Points represent 25,50 & 75 % of the cumulative catches.

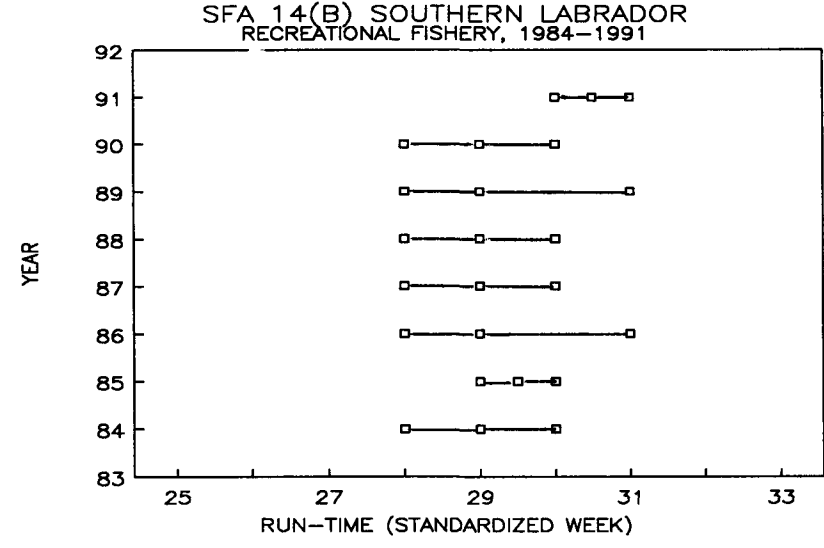
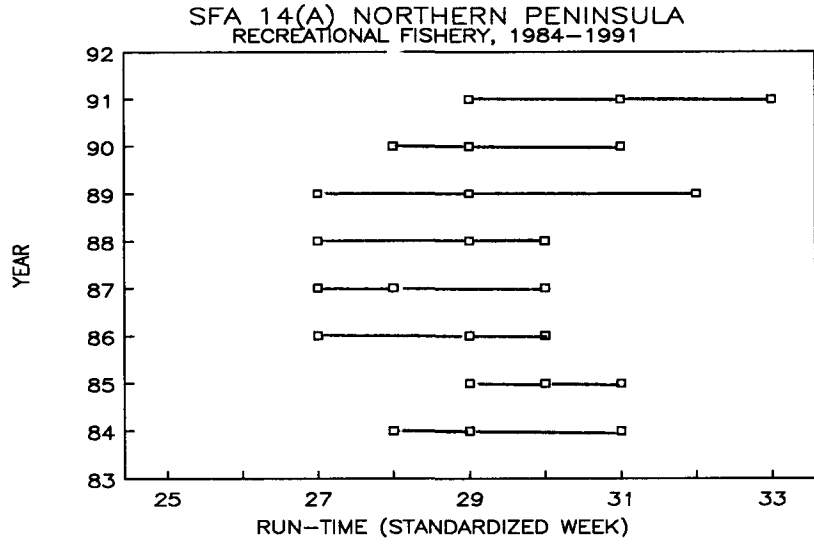
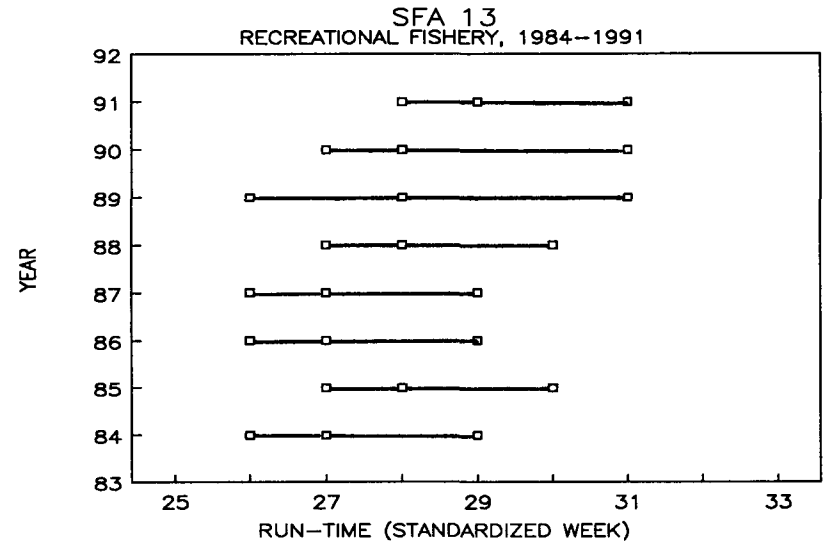
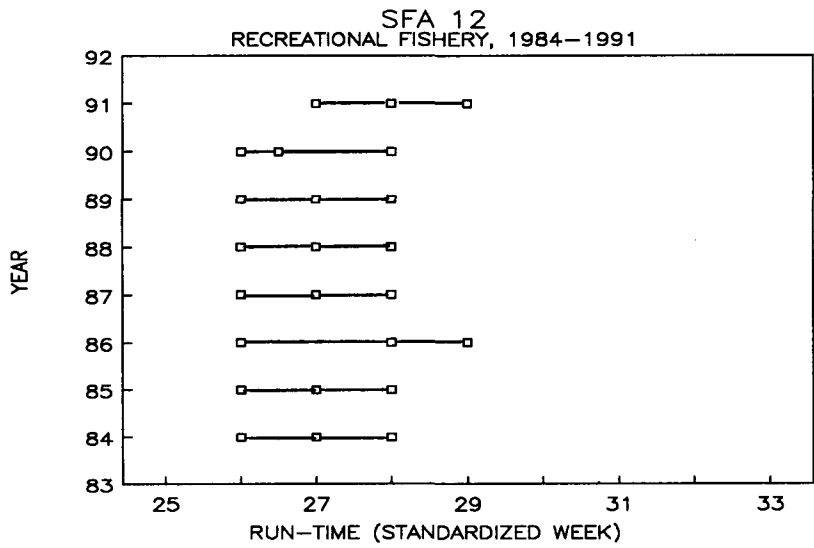


Fig.11. Timing of recreational fisheries harvests in standardized weeks, 1984-91. Points represent 25,50, and 75 percent of the cumulative catch taken.

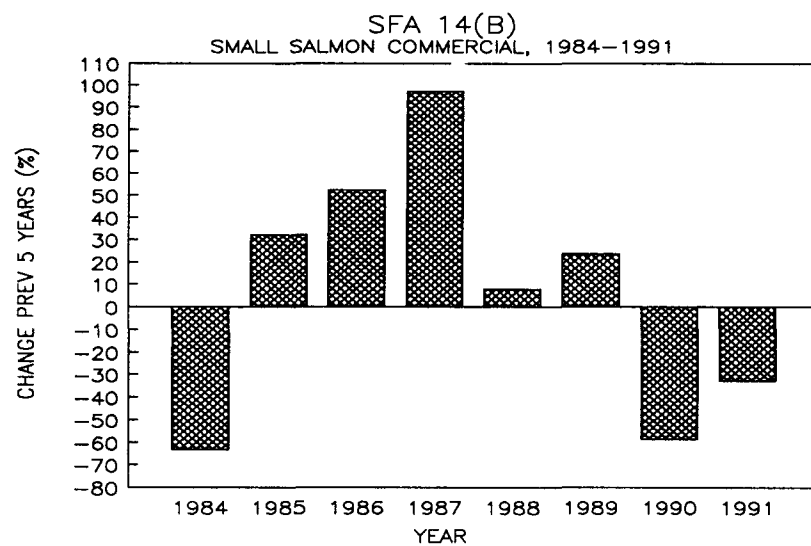
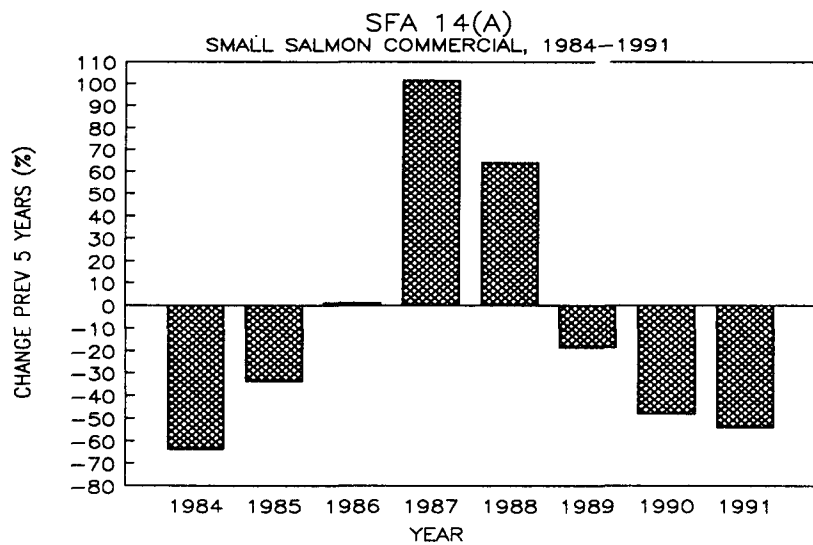
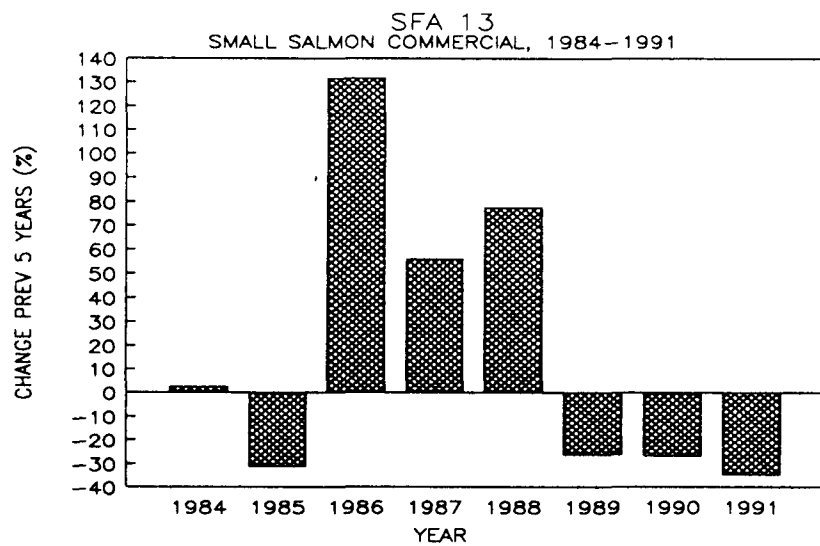


Fig. 12. Percent change in SFA 13, 14(a), and 14(b) commercial harvests from the previous five year for 1984-91.

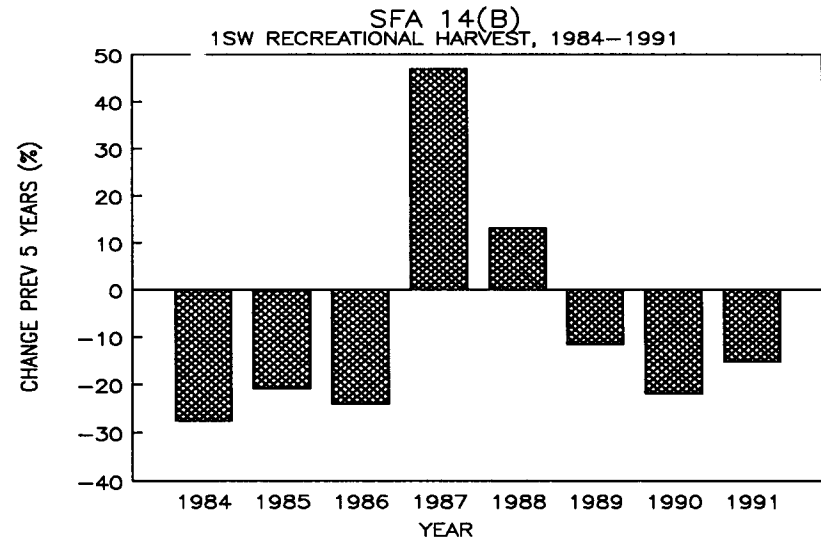
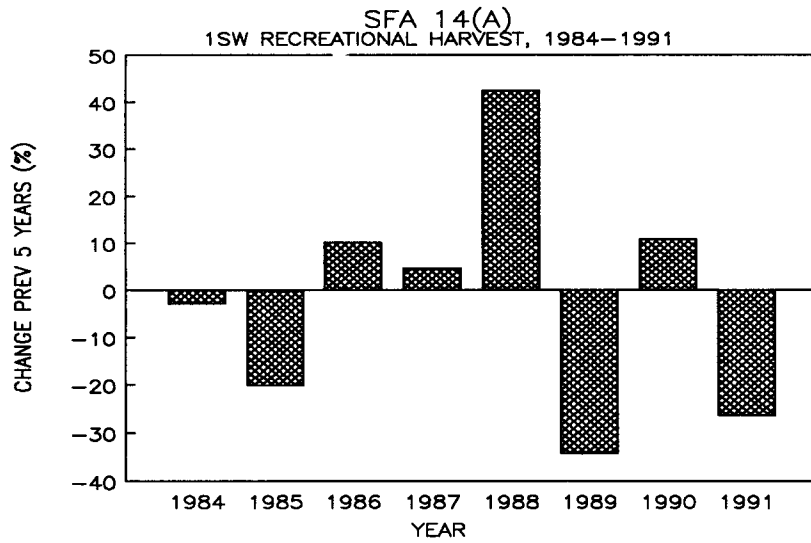
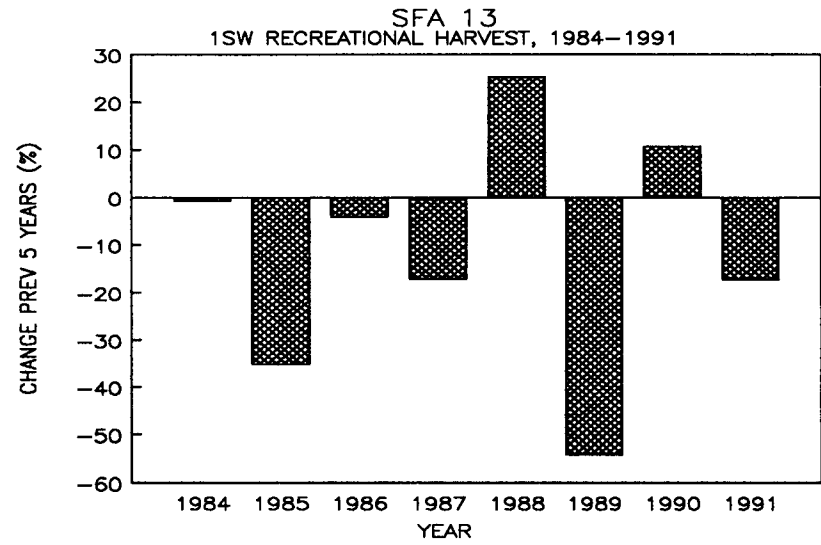
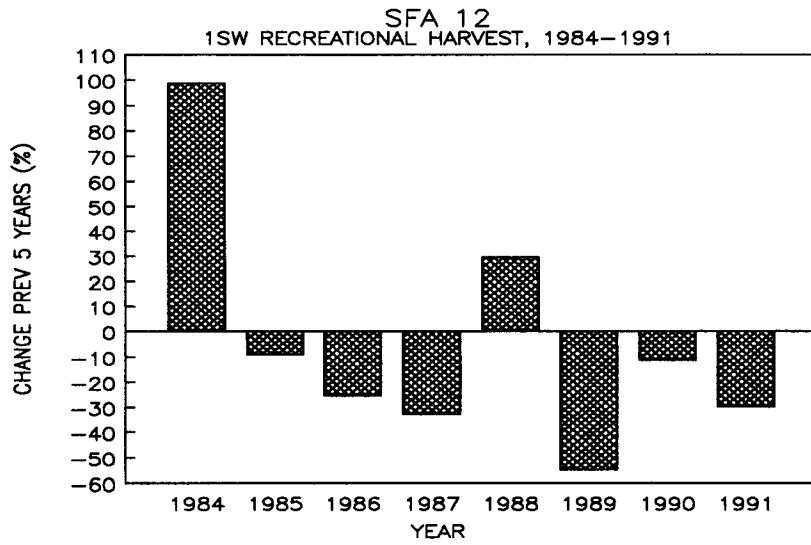
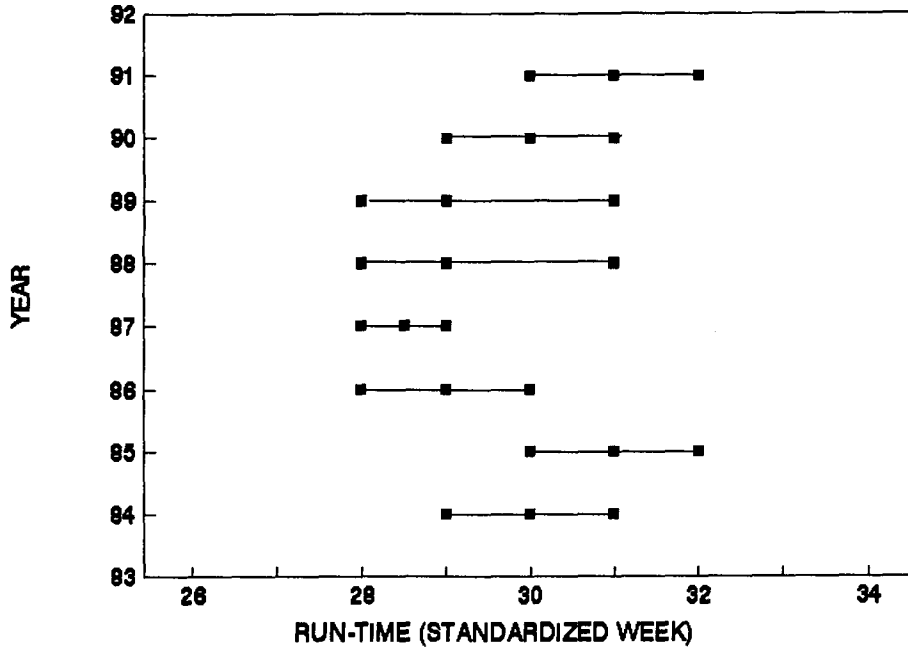


Fig. 13. Percent change in SFA 12,13,14(a), and 14(b) recreational harvests for the previous five year mean for 1984-91.

### TORRENT RIVER FISHWAY GRILSE MIGRATION 1984-1991



### WESTERN ARM BROOK COUNTING FENCE SMOLT MIGRATION, 1984-1991

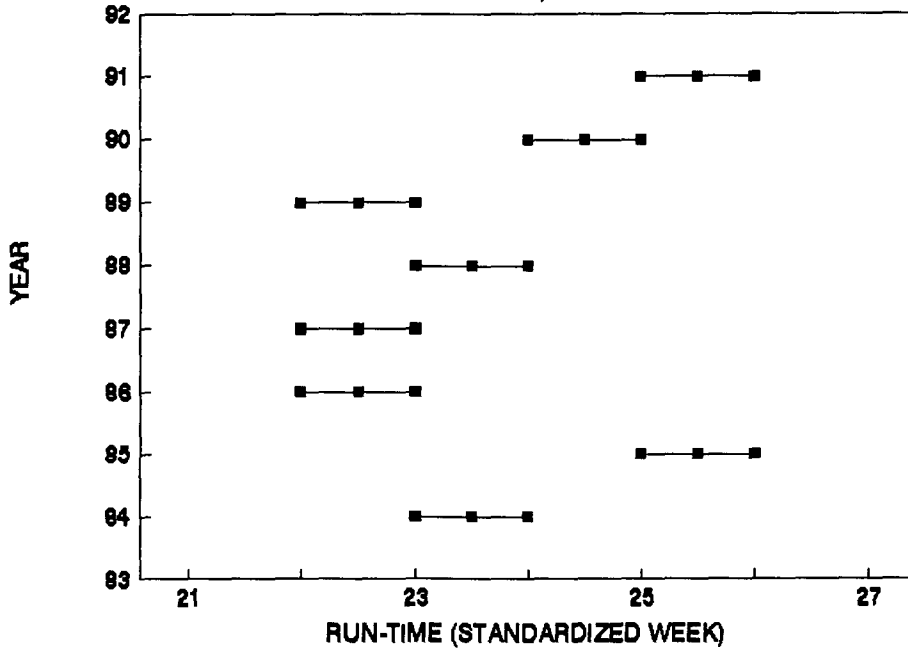


Table 14. Run-timing of grilse returns to Torrent River Fishway and run-timing of smolt migrations at Western Arm Brook counting fence, 1984-1991. Points represent the 25, 50 and 75 percentiles of cumulative returns.

# TORRENT RIVER FISHWAY

GRILSE MIGRATION, 1984-1991

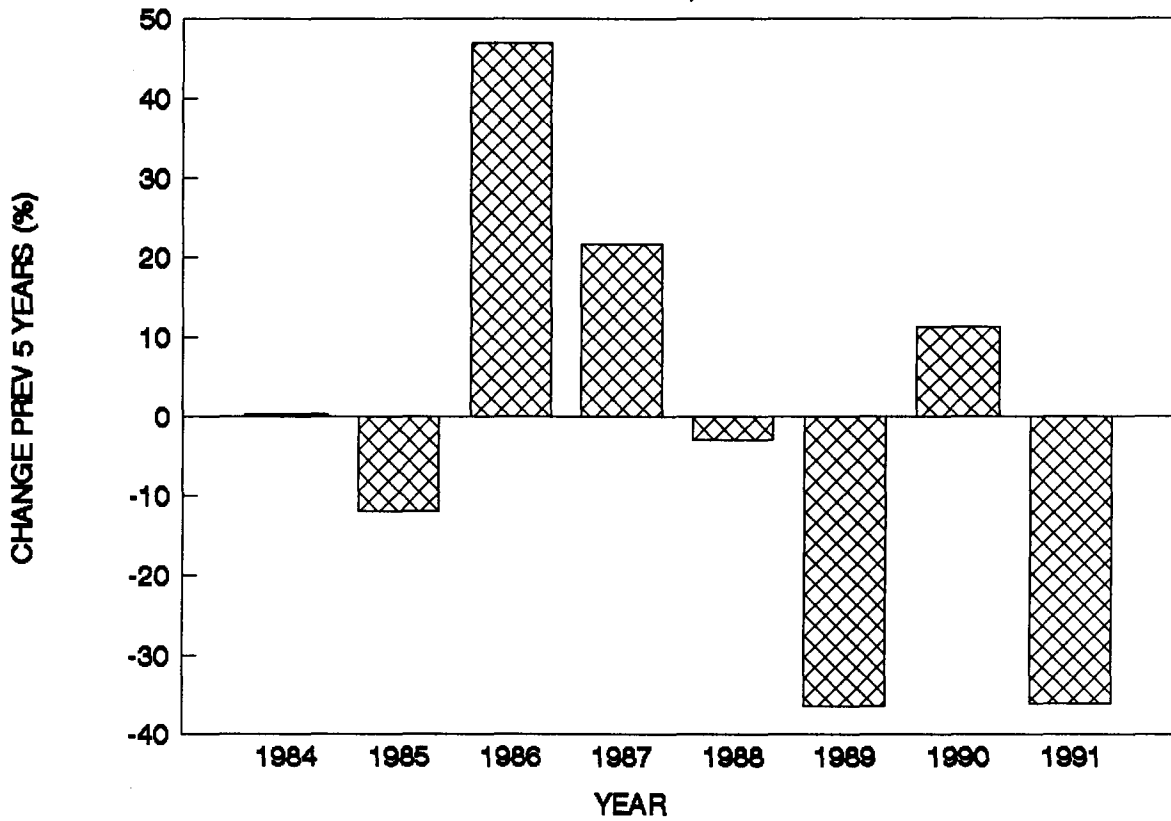


Figure 15. Percent change in Torrent River Fishway grilse returns from the previous five year mean, 1984-1991.

# STATISTICAL AREA M+N FORECAST

1992

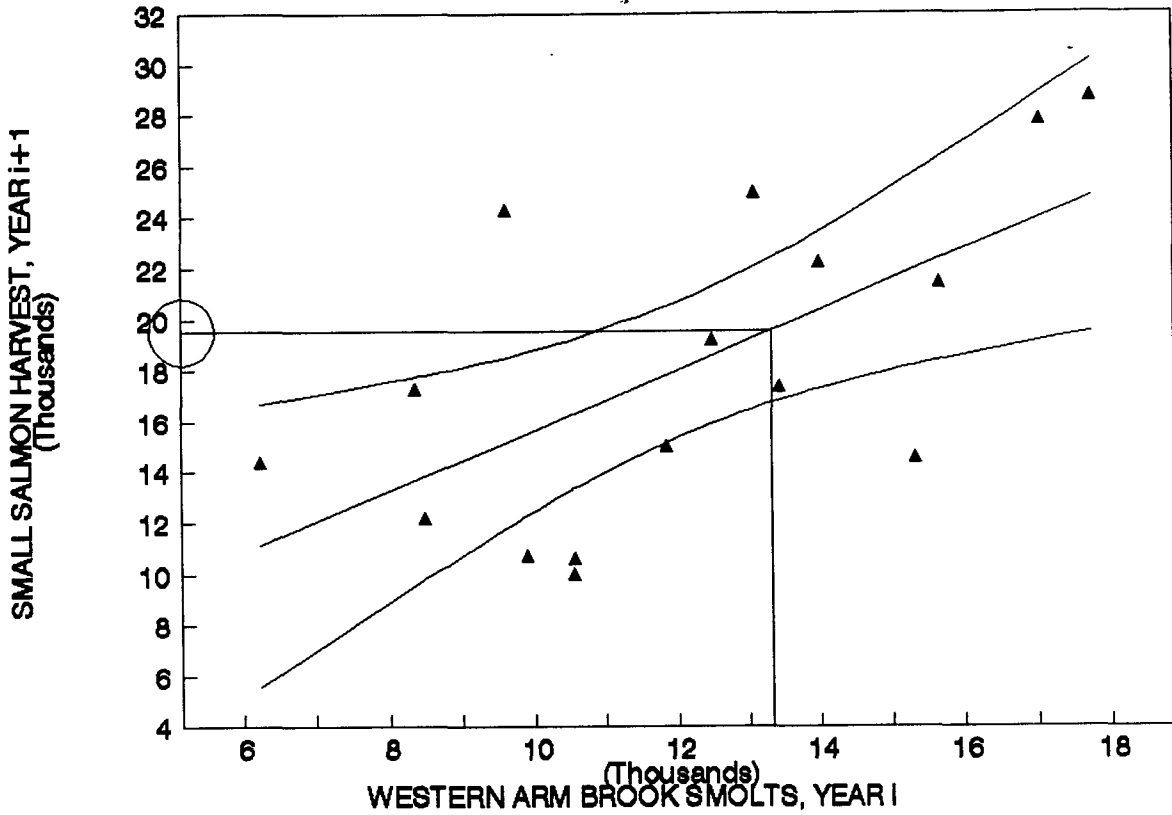


Figure 16. Forecast of 1992 total commercial and recreational harvests of small salmon in Statistical Area M and N, SFA 14(A). Center line represents the regression line; outer lines represent 95% confidence limits. Circle shows harvest forecast for 1992.